Original Study

COMPARISON OF ORAL HEALTH BETWEEN LEFT AND RIGHT HANDED PATIENTS REFERRED TO DENTAL CLINIC OF GUILAN UNIVERSITY OF MEDICAL SCIENCE

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ABSTRACT

Aim: The aim of this study was to compare the effect of manual brushing on oral health between left and right-handed patients and also between the left and right side of oral cavities in each group.

Materials & Method: In this descriptive cross-sectional clinical study 78 patients were included. The patients were divided into two groups 30 left handed patients(LH) and 48 right handed patients(RH). Some parameters such as Plaque Index (PI), Gingival Bleeding Index (GBI), Clinical Attachment Level, Periodontal Disease Index (PDI), and the number of Decay-Missing-Filling Tooth (DMFT) for all teeth except for the third molar were recorded. For data t-Student test was recruited.

Results: The mean of DMFT in RH patients was higher than LH patients indicating a significant statistical difference while no significant difference in terms of PI, PDI, and GBI was found between the two groups. Moreover, a significant difference between left and right side of the oral cavity in RH patients was noted so that the average of DMFT and GBI in right side and average of CAL (Clinical Attachment Loss) on the left side of RH patients was higher.

Conclusion: Comparatively, the higher average of DMFT in RH patients indicates better oral health in LH patients that may be due to better neuromuscular potentials of LH patients. Furthermore, higher DMFT and GBI in the right side and higher CAL in the left side of RH patients may be due to better accessibility and more force applied in opposite direction of dominant hand while LH patients experience rather similar access and oral health on both sides.

Key words: Dental caries, Dental plaque, Oral hygiene.

Introduction

Dental plaque plays an important role in decay formation and periodontal diseases.[1] Dental decay is the main factor in tooth missing up to 35 years in men while missing teeth after this age are because of periodontal diseases. Daily brushing is known as the most reliable procedure for achieving oral health in all dental patients.[2] Controlling plaque solely by brushing is not sufficient for controlling and eliminating all periodontal, gingival and dental diseases since periodontal lesions often initiate from internal spaces.[3] Gingival inflammation distribution differs among different patients and even among different areas of the oral cavity in the same patient which is associated with host response and plaque microbiology.[4-5] Moreover, the manner of brushing, time intervals, duration, applied force and experience[6] result in great differences in plaque removal from tooth surfaces. Correlation between brushing efficacy and neuromuscular abilities of individuals is of high importance.

Despite discrepancies in different studies on the rate of plaque removal or gingivitis between LH and RH patients, it is believed that left or right handedness is effective on oral health and makes difference.[7-10] In addition, preference of right or left hand depends on the neuromuscular concentration and genetic factors albeit some disagreement.[11]

In this article we try to measure oral hygiene status with some parameters such as DMFT which is the number of Decay-Missing-Filling Tooth, GBI-CAL-PDI which shows the condition of gums and PI as an indicator of the way and the accuracy of oral hygine each patient perform.

The aim of this study was to compare gingival health and oral hygiene status between LH and RH patients referred to the Dental Clinic, School of Dentistry, Guilan University of Medical Sciences. If a significant difference is found between them, special attention for health education in different parts of the oral cavity and certain recommendation for the design of the head of the brush is warranted.

Materials & Method

This descriptive cross sectional clinical study began on first month of 1394 and lasted for 4 month, include 78 patients ranging from 20-50 year old referred to the dental clinic of Guilan university of medical science. Smoker patients with systemic diseases or under special drugs affecting their periodontal heath and cases with disability were excluded. Patients that their mastication was limited to only one side of their jaws (due to TMJ disorder or tooth discomfort) were also excluded. The patients were divided into two groups- LH and RH-designated by Edinburgh Handedness Scale.[12] Each group comprised of 39 cases regardless of their gender or periodontal heath status. First, we tried to gather LH patients then a group of RH patients whose age and socioeconomic status were similar were recruited and the same expert examined both groups in order to minimize examination errors.

To determine sample size, according to the articles such as "comparison of the oral hygiene status and gingival health between left and right handed individuals" and with the confidence interval of 95% and the following formula, the sample size was calculated.

p_1=57.9 %

p_2=81 %

$z_{1-\alpha/2}$=1.96 %

$z_{1-\beta}$ =90%

$$n = \frac{(z_{1-\alpha/2} + z_{1-\beta})^2 (p_1(1-p_1) + p_2(1-p_2))}{(p_1 - p_2)^2} \cong 78$$

In the first session,we explain about our study. Patients were able to quite whenever they wanted. All periodontal variables in four areas-mesial, distal, buccal and lingual-for all teeth except for the third molar were recorded. The collected data included:

1. DMFT (clinical examination),
2. Dental plaque assessment PI[13] using disclosing agents,
3. BI,[14]
4. Pocket depth assessment by PDI on mid-buccal, mesiobuccal, and distobuccal areas by William Probe with the following scales:
   - Scale 0 = Depth 0-3
   - Scale 1 = Depth 4-5
   - Scale 2 = Depth 6-7
   - Scale 3 = Depth more than 8.[15]
5. Clinical Attachment Loss (CAL).

For analyzing the difference between two groups student's t-test and Kolmogorov-Smirnov test were recruited and p<0.05 was considered significant.

Results

In a comparison of left and right side of the oral cavity in RH patients, paired t-test revealed a significant statistical difference regarding DMFT (p=0.006) in that the average of DMFT in right side was higher than the left side. [Figure1] However, comparison of the average of DMFT in the left or right side in LH patients.

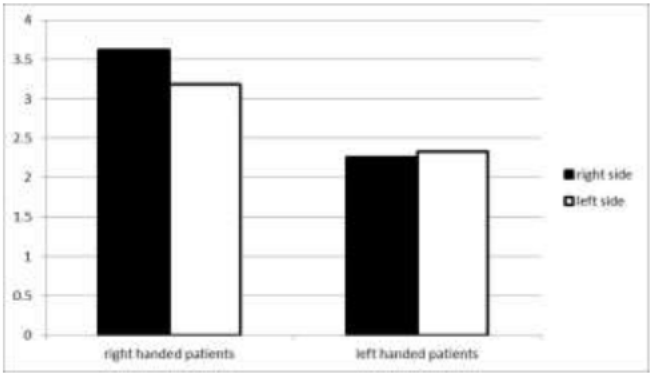

Figure 1: Comparison of DMFT in two sides of the oral cavity in LH and RH patients

PI in the left or right side or upper and lower teeth in both groups proved no significant difference. [Figure 2]

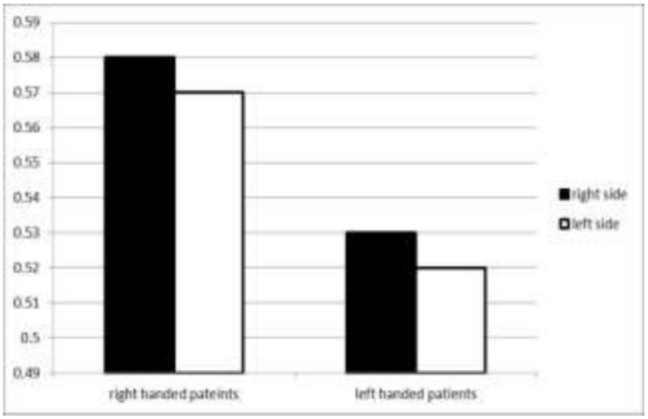

Figure 2: PI in two sides of LH and RH patients.

Whereas GBI in right side of RH patients was more than the other group and was significant (p=0.001). [Figure 3]

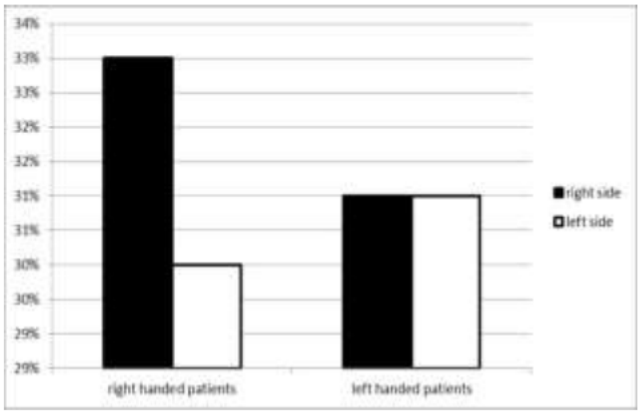

Figure 3: GBI in two sides of LH and RH patients.

No significant difference regarding the gingival bleeding in the left or right side of LH patients and upper or lower teeth of both groups was found. The percentage of CAL on the left side of RH patients was significantly higher than the right side (p=0.027). But the average percentage of CAL in left and right sides of LH patients (p=0.0331) and lower or upper teeth of both groups was not significantly different. [Figure 4]

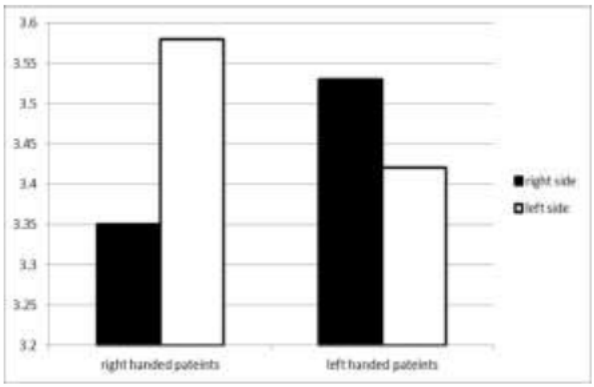

Figure 4: CAL in two sides of LH and RH patients.

In addition, comparison of PDI in the left or right side or lower and upper teeth in both groups revealed no significant difference. [Figure 5]

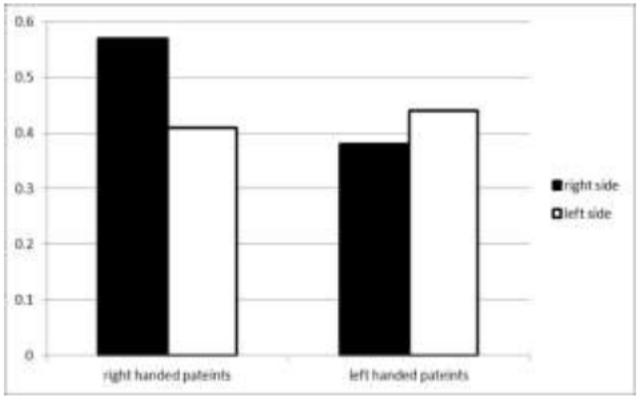

Figure 5: PDI in two sides of LH and RH patients.

Discussion

In comparison of RH and LH patients, in our study, we found higher DMFT in RH patients and while comparing two sides of oral cavities of patients, differences were observed only in RH patients as 2 indices; GBI and DMFT were higher in right sides of them but CAL was higher in left sides.

In a similar study on gingival health and oral hygiene Feyton *et al*[16] found that LH patients were more successful in performing activities such as painting, music and providing oral hygiene than RH patients.[8] Also, he reported that ideal oral hygiene and gingival health were noted in LH patients that may be due to their higher neuromuscular capabilities which was consistent with our study.

Tezzel *et al*[17] in 2001 in a study on the rate of gingival recession showed that LH patients had a higher level of hygiene than RH patients although it was not significant, again the results were consistent with ours.

Binali *et al* in a study on 46 primary school students found that the decay prevalence in RH students was lower than LH ones –though not significant- which was unlike our findings. On the other hands, dental decay is multifactorial and parameters such as genetics, nutrition as well as oral hygiene are important in the prevention of decay. Besides, comparison of DMFT in lower and upper arches yielded no significant difference both inside and between right and left handed groups.

In our study PI in RH patients was a little higher than LH patients- but not statistically significant- which is in line with Binali *et al* study[18] and unlike the study of Firas *et al.*[19] Although Binali *et al*. could not find any association between dominant hand and PI, Firas *et al* reported a significant difference between left and right side inside both groups in that more plaque accumulation-higher PI- on the side of dominant hand indicates more brushing control and concentration of more force on the opposite side of the dominant hand.

Although the average of PI in RH patients was not significantly lower than LH patients , but the lower averages indicate that after health education session, promotion of health in RH patients was higher than the other group. [Figure 6]

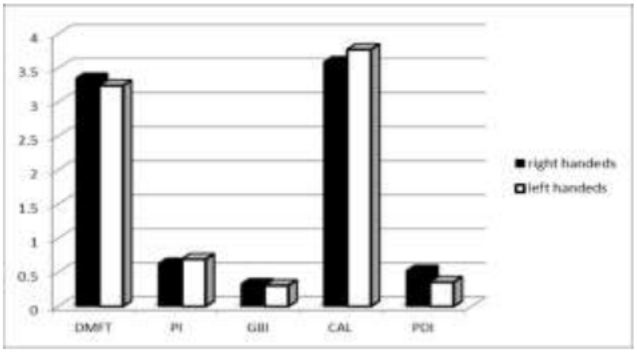

Figure 6: Comparison of DMFT, PI, CAL, PDI between left and right handed patients.

Kadkhodazade *et al*[20] in a study on assessing of oral hygiene in different quadrants and on the effect of preferred hand in two phases, before and after education and also on the comparison of PI (before and after brushing) found that LH patients had higher oral hygiene than RH patients, although not significant (the average of initial PI in LH patients was lower than RH patients). In the second phase – after health education session and course of brushing – a change in the results was found and the average of PI in RH patients decreased more than LH patients.

Higher DMFT and GBI in right side of RH patients in our study is similar to the finding of Andy et.al in which RH patients showed gingivitis and plaque accumulation in right side more than the left side. Similar condition of two sides of LH patients, in terms of plaque distribution and gingivitis, may be due to the ability of LH patients to brush left and right buccal surfaces equally.

Since clinical attachment level is related to gingival recession, periodontal pocket formation and gingivitis and since in RH patients both plaque accumulation and GBI in right side (side of the dominant hand) are higher, it can be concluded that more CAL in the opposite side of dominant hand is associated with non- inflammatory gingival recession. Several factors are contributed to non-inflammatory gingival recession such as duration, frequency, and technique of brushing as well as the force applied. The highest rate of gingival recession is seen in the horizontal technique of brushing. A justification for more CAL in opposite side of the dominant hand may be due to applying more force on the left side of RH patients which was consistent with Firas *et al* study[19] in which more control of brush and more concentration of force on the opposite side of the dominant hand was indicated.

Myra found that "applied force" is the main factor in the brushing pattern. He could not find any significant difference in terms of CAL in left or right sides nor in maxillary or mandibular teeth.[21]

More PDI in one side reflects more pocket depth and poor periodontal health status on that side and vice versa. These findings are in line with the results obtained from other

studies and means better oral hygiene in the opposite side of the dominant hand. Feyzan Otan *et al*[16] reported the same result indicating that LH patients performed better brushing on the buccal surfaces of maxillary and mandibular teeth.

For improving oral hygiene, some procedures are provided by Dentists: motivation and hand skill in brushing and flossing. In this study and some other ones, a correlation was found between better oral hygiene and less dental caries. On the other hand, in some studies like Binali *et al*[18] it was found that RH patients had better oral hygiene and less incidence of dental decay. Several factors are responsible for such discrepant results as patient population, patient's selection criteria, mouth breathing, occlusal abnormalities, bruxism, cariogenicity of the regime, chewing and swallowing disorders, the abnormal pressure of facial muscles, the composition of the teeth, socioeconomic status and brushing behaviour.[22] In some investigation related to age, gender and brushing habits, it was notified that females had better health status than males although not significant.[23] Electrical brush is recommended for handicaps and those with poor hand skill in order not to endanger their health status due to limited hand skills.[24]

Based on a multiple-choice questioner, a relation was found between oral health and level of awareness though this relation is of less importance than the relation between hand skill and oral health.

Conclusion

Higher DMFT in RH patients and poorer oral hygine on the dominant sides of oral cavities only in RH patients show that LH patients had better health status than RH patients. It may be due to better neuromuscular capabilities,though this finding should be confirmed with more neurological investigation.

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