

# The Prevalence of Tongue Thrusting in Patients with Periodontal Disease

S.A. Miremadi<sup>1,2</sup>, A.A. Khoshkhounejad<sup>3</sup>, E. Mahdavi<sup>4</sup>

<sup>1</sup> Associate Professor, Department of Periodontology, Faculty of Dentistry, Tehran University of Medical Sciences, Tehran, Iran

<sup>2</sup> Associate Professor, Detal Research Center, Tehran University of Medical Sciences, Tehran, Iran

<sup>3</sup> Professor, Department of Periodontology, Faculty of Dentistry, Tehran University of Medical Sciences, Tehran, Iran

<sup>4</sup> Dentist, Private practice

## Abstract:

**Statement of Problem:** Tongue thrust and/or its consequent swallowing pattern are amongst the parafunctional habits that have always been considered as etiological factors for dental disorders by different investigators.

**Purpose:** The aim of this study was to investigate the prevalence of tongue thrusting and the incidence of periodontal disorders associated with this habit among patients referred to the Department of Periodontology, School of Dentistry, Tehran University of Medical Sciences.

**Material and Methods:** Two hundred and eighty patients, undergoing first phase of periodontal therapy, were selected. Among them, those who had tongue thrusting were diagnosed and periodontal indices (probing depth, gingival recession, spacing and gingival enlargement) were measured. Also, crown-root ratio was assessed for each anterior tooth.

**Results:** Tongue thrusting was seen in 27.3% of patients, whereas 29.8% and 33.8% of them showed an increase in periodontal pocket depths in their upper and lower jaws, respectively. Gingival recession was found in the upper jaw in 12.98% and in the lower jaw in 49.35% of the cases. Crown to root length ratio in 24.6% of the upper incisors and 35.1% of the lower incisors were found to be higher than normal. Spacing was observed between the incisors in 31.2% and 41.6% of the patients in the upper and lower jaws, respectively. Finally 31.2% of the patients showed gingival enlargement.

**Conclusion:** The results of the present study revealed a considerable increase in the prevalence of various periodontal diseases among these subjects. To minimize the clinical problems of such patients, prevention of periodontal diseases through excellent oral hygiene and regular dental visits are suggested.

**Key words:** Tongue thrust; Periodontal Diseases; Swallowing Pattern

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✉ Corresponding author:  
SA Miremadi, Department of  
Periodontology, Faculty of  
Dentistry, Tehran University of  
Medical Sciences, Keshavarz  
Bulv., Gods St., Post Code:  
14147, Tehran, Iran.  
asgharmiremadi@yahoo.com

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## INTRODUCTION

Tongue functions or its related habits have always been focused upon by investigators as etiologic factors for dental disorders. During swallowing, rest and mastication, the tongue exerts a force on teeth, which is in equilibrium

with forces exerted by the lips and cheeks resulting in a normal occlusion. Disruption of the mentioned equilibrium for any reason leads to the creation of abnormal forces and finally dental disorders [1].

Swallowing with tongue thrust, as a para

functional tongue habit has long been appreciated and considered by investigators as an etiologic factor for dental disorders [2].

This swallowing pattern has been characterized as forward displacement of the tongue and its placement between the incisors and does not possess the characteristics of a normal swallowing. In a normal swallowing pattern, the dorsal part of the tongue touches the palate and the tip is placed on the back of the upper incisors [3]; whereas in a tongue thrusting habit, the middle part of tongue does not touch the hard palate and the tip of the tongue is placed on the back of the lower incisors or between the teeth [2,4].

Most clinicians believe that tongue thrusting, due to abnormal position of the tongue, disturbs the equilibrium existing between forces exerted upon teeth, and finally results in dental complications and disorders [5].

Carranza states that during swallowing with a tongue thrusting pattern, the tongue is pushed forward and exerts a force on the incisors, leading to inclination and lateral displacement of the teeth. The exerted forces can be harmful to the periodontium [1]. An alteration in the angulations of incisors in the dental arch, as compared to the normal position, leads to a change in the direction of functional forces, not being parallel to the long axis of the teeth. Consequently, lateral pressures increase, which finally result in labial drift of the incisors and a production of labial-lingual rotational forces [1]. Disruption of the equilibrium between forces exerted from the lips and tongue leads to tooth mobility. Tooth angle alteration results in accumulation of food debris in the gingival margin and a lack of tooth contact causes food impaction [1].

A large number of investigators have already worked on the relationship between tongue thrust and occlusal problems including increased overjet, open bite, etc. However, the relationship between periodontal complications and this oral habit has not yet been fully

investigated. Generally, a deeper knowledge of the predisposing factors of a disorder, results in a better and/or more successful treatment. On the other hand, recognizing these factors and diagnostic measures can be useful in the early prevention of soft and hard tissue disorders and failure of periodontal treatment. The aim of this study was to investigate the prevalence of tongue thrusting in patients referred to the Department of Periodontology, School of Dentistry, Tehran University of Medical Sciences.

## MATERIALS AND METHODS

The present investigation is an observational, case series study. Inclusion criteria included subjects requiring first phase of periodontal treatment without any age or sex limitations. Following a pilot study and statistical consultation, a population of 280 patients was selected through examining all patients referred to the Department of Periodontology, School of Dentistry, Tehran University of Medical Sciences, from October 2002 to June 2003. All these patients initially underwent a thorough routine periodontal examination including measurement of probing depth, gingival recession, presence of spacing between incisors and crown-root length ratio. The results were recorded for each patient while cases with tongue thrusting were diagnosed. For such a diagnosis, the following assessments were made:

### 1- Examination of phonetics:

Patients with tongue thrusting are not able to pronounce sibilant sounds (s, z ...) correctly. All patients were asked to count from 60 to 70. Among those with this problem, a whistle sound is heard upon pronunciation of the letter /S/ [6].

### 2- Evaluation of the activity of the mentalis muscle:

a) Upon swallowing, hyperactivity of the mentalis muscle is observed. If the lower lip of these subjects is pulled out, they will not be

able to swallow [3].

b) Patients were asked to sit upright on a chair so that their spinal column would be perpendicular to the horizontal plane. In such situations, severe contraction of the mentalis can be observed on swallowing [3].

Periodontal conditions were evaluated on the basis of the following parameters:

1- Probing depth, determined at six sites using a Williams's probe: (mesiobuccal, buccal, distobuccal, mesiolingual, lingual and distolingual). The deepest measurement was considered as the probing depth for each tooth.

2- Gingival recession, measured as the distance from the gingival margin to the CEJ on the buccal and lingual aspects of each tooth using a Williams probe. The mean value between these two scores was recorded.

3- The existence of space between the anterior teeth, as a qualitative variable, which was observed and recorded as presence or absence of space.

4- Crown-root length ratio (C/R Ratio), obtained by dividing the distance between the incisal tip and crest of the alveolar bone to the length of the root inside the alveolar bone. This ratio was determined by linear measurement of parallel periapical radiographs.

5- Gingival enlargement, as a qualitative variable, which was evaluated through direct observation and by comparing it with the normal position of the gingival margin (maximally at 1 mm coronal to the CEJ).

All the mentioned variables were measured on the upper and lower incisors.

In order to minimize any possible kind of mistake, the evaluation of the above-mentioned periodontal variables and the presence of tongue thrusting were recorded individually.

## RESULT

In this investigation, the total number of 280 patients was studied, which revealed 77 to

have tongue thrusting (27.3%).

Among these 77 subjects, the following results were obtained:

In the upper jaw of 54 patients, the probing depths of the four investigated teeth were less than 3 mm, whereas in the other 23 patients, the average probing depth was found to be  $\geq 3$  mm, implying that totally 29.8% of these patients had an increase in maxillary periodontal pocket depths. The range of maxillary probing depth was recorded as 0.5-5 mm.

In the lower jaw of 51 patients, none of the four investigated teeth showed probing depths of  $\geq 3$  mm. In 26 cases (33.75%) increased periodontal pocket depths were observed. Mandibular probing depths ranged from 0.5 mm to 5.5 mm. Gingival recession was observed in 12.9% and 49.3% of the patients, in the upper and lower jaws, respectively.

The range of gingival recession measurements was 0 mm to 3.5mm in the upper jaw and from 0mm to 4 mm in the lower jaw.

In the upper jaw of 19 patients (24.6%), crown to root length ratio was observed to be higher than the ideal value (1/2) reported previously [7]. In the lower jaw of 35.1% of the cases, this ratio was higher than the ideal score.

Space between the anterior teeth was observed in 31.2% of the subjects. In all of these cases, both jaws were involved.

Patients were asked about their chief complaints; 51.9% of them complained from heavy calculus accumulation and its rapid formation on teeth. Gingival bleeding and halitosis were mentioned as chief complaints by 13% and 6.5% of the cases, respectively. The remaining 28.6% presented with other complaints such as tooth mobility, toothache, tooth staining and some were referred from other Departments of the Faculty of Dentistry.

## DISCUSSION

Tongue thrusting has always been considered as a complication in the diagnosis and

prognosis of orthodontic treatments. Although numerous investigations have been conducted in this field, less attention has been focused on the potential effects of tongue thrusting on the periodontium. The present study investigated the prevalence of tongue thrusting among periodontal patients. The study group consisted of 280 patients, 77 of whom (27.3%) had tongue thrusting. According to the literature, the prevalence of tongue thrusting among the normal population was found to be about 3% [4,8,9]. The higher prevalence of this oral habit among periodontal patients is indicative of a possible correlation between this habit and periodontal diseases.

Heavy calculus accumulation in short periods, forces most of these patients to consult a clinician (51.9%), although, other complaints like gingival bleeding, halitosis and tooth staining were also in close association with calculus formation. However gingival bleeding tendency and halitosis can be considered secondary to calculus accumulation.

The incidence of all investigated variables were drastically higher in the lower jaw, indicating more pronounced effects of abnormal positioning of the tongue on the lower jaw as compared to the upper jaw. It should be mentioned however, that among the normal population, the highest amount of calculus formation is generally observed on the lower incisors.

It is an interesting finding that spacing between anterior teeth was seen on both jaws simultaneously. This finding can emphasize the effects of tongue position on the force equilibrium which is an important factor in determining tooth position.

According to the obtained findings, a higher prevalence of periodontal diseases in the lower jaws of subjects with tongue thrusting may

result from a combination of the higher probability of calculus accumulation in the lower jaw and the possible effects of tongue position during swallowing.

## CONCLUSION

Considering the present findings, the necessity of preventing periodontal diseases among people with tongue thrusting becomes more obvious. Regular periodontal examinations, excellent oral hygiene using toothbrush and dental floss for the prevention of gingivitis and periodontitis, and also precise and systematic follow-up are highly recommended.

## REFERENCES

- 1- Newman MG, Takei H, Carranza FA. Carranza's Clinical Periodontology. 9th ed. Philadelphia: WB Saunders; 2002
- 2- Profit WR. Contemporary Orthodontics. 3rd ed. St. Louis: Mosby Year Book; 2000
- 3- Moyers RE. Hand Book of Orthodontics. 4th ed. St. Louis: Year Book Medical Publishers; 1998
- 4- Shetty SR, Munshi AK. Oral habits in children-- a prevalence study. J Indian Soc Pedod Prev Dent 1998 Jun;16(2):61-6.
- 5- Williamson EH, Hall JT, Zwemer JD. Swallowing patterns in human subjects with and without temporomandibular dysfunction. Am J Orthod Dentofacial Orthop 1990 Dec;98(6):507-11
- 6- Pound E. Let /S/ be your guide. J Prosthet Dent 1977 Nov;38(5):482-9.
- 7- Schillingburg H, Hobo S, Whitsett LD. Fundamentals of Fixed Prosthodontics. 7<sup>th</sup> ed. Philadelphia: WB Saunders; 1997
- 8- Andrianopoulos MV, Hanson ML. Tongue-thrust and the stability of overjet correction. Angle Orthod 1987 Apr;57(2):121-35.
- 9- Larsson E. Artificial sucking habits: etiology, prevalence and effect on occlusion. Int J Orofacial Myology 1994 Nov;20:10-21.

# شیوع تانگ تراست در بیماران پریدنتال

س. ا. میرعمادی<sup>۱</sup> - ع. خوشخونزاد<sup>۲</sup> - ا. مهدوی<sup>۳</sup>

<sup>۱</sup> نویسنده مسؤل؛ دانشیار گروه آموزشی پریدنتولوژی، دانشکده دندانپزشکی، دانشگاه علوم پزشکی تهران، تهران، ایران

<sup>۲</sup> دانشیار مرکز تحقیقات دندانپزشکی، دانشگاه علوم پزشکی تهران، تهران، ایران

<sup>۳</sup> استاد گروه آموزشی پریدنتولوژی، دانشکده دندانپزشکی، دانشگاه علوم پزشکی تهران، تهران، ایران

<sup>۴</sup> دندانپزشک عمومی

## چکیده

**بیان مسأله:** تانگ تراست یا تغییر الگوی بلع یکی از عادات پارافانکشنالی است که همواره به عنوان یکی از عوامل اتیولوژیک مشکلات دهانی - دندانی مطرح می‌باشد.

**هدف:** مطالعه حاضر با هدف تعیین شیوع تانگ تراست و انواع مشکلات و بیماریهای پریدنتال متعاقب آن انجام شد.

**روش تحقیق:** ۲۸۰ بیمار از مراجعه کنندگان به بخش پریدنتیکس دانشکده دندانپزشکی دانشگاه علوم پزشکی تهران که در مرحله اول درمان پریدنتال بودند، جهت مطالعه انتخاب شدند. در این میان بیمارانی که تانگ تراست داشتند، انتخاب و شاخصهای پریدنتال (عمق پروبینگ، تحلیل لثه، Spacing و افزایش حجم لثه) در آنها اندازه گیری شد؛ همچنین نسبت طول تاج به ریشه در دندانهای قدامی محاسبه گردید.

**یافته‌ها:** تانگ تراست در ۲۷/۳٪ از بیماران مشاهده گشت؛ افزایش عمق پاکت در فک بالا در ۲۹/۸٪ و در فک پایین در ۳۳/۳٪ از این افراد و تحلیل لثه در ۱۲/۹۸٪ موارد در فک بالا و در ۴۹/۳۵٪ موارد در فک پایین وجود داشت. در ۲۴/۶٪ موارد در فک بالا و در ۳۵/۱٪ موارد در فک پایین، نسبت طول تاج به ریشه بیش از حد طبیعی بود. Spacing در ۳۱/۲٪ در فک بالا و در ۴۱/۶٪ در فک پایین بیماران مشاهده شد؛ ۳۱/۲٪ از بیماران مبتلا به افزایش حجم لثه بودند.

**نتیجه گیری:** نتایج مطالعه حاضر نشان داد افزایش قابل توجهی در شیوع بیماریهای پریدنتال در افراد مبتلا به تانگ تراست، وجود دارد. جهت کاهش مشکلات کلینیکی این بیماران، پیشگیری از مشکلات پریدنتال از طریق رعایت بهداشت دهان و معاینه منظم دندانپزشکی توصیه می‌شود.

**واژه‌های کلیدی:** تانگ تراست؛ بیماریهای پریدنتال؛ الگوی بلع

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