

ORIGINAL RESEARCH

Impact of denture wearing on retropharyngeal space in edentulous patients

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ABSTRACT

Background: Obstructive sleep apnea syndrome (OSAS) is a condition marked by recurrent upper airway obstruction, snoring, and excessive daytime sleepiness as a result of apnea and hypoapnea episodes during sleep. The present study was conducted to assess impact of denture wearing on retropharyngeal space in edentulous patients. **Materials & Methods:** 50 edentulous patients of both genders were divided into 2 groups of 25 each. Group I were edentulous patients wearing no denture and group II were wearing denture. Lateral Cephalograph of edentulous subjects and lateral Cephalograph of same edentulous subject wearing complete denture with acceptable vertical dimension of occlusion. Parameters such as retropharyngeal space (Mp-Lp), posterior airway space, apw2-ppw2, and apw4-ppw4 were recorded. **Results:** Out of 50 patients, 28 were males and 22 were females. In group I and group II, the mean retropharyngeal space (Mp-Lp) was 11.3 mm and 14.5 mm, posterior airway space was 12.3 mm and 15.7 mm, apw2- ppw2 was 13.2 mm and 15.9 mm and apw 4-ppw 4 was 18.4 mm and 20.2 mm respectively. The difference was significant ($P < 0.05$). **Conclusion:** Retropharyngeal space (RPS) and posterior airway space (PAS) were found to be reduced in edentulous subjects as a result of anatomical changes that caused a decrease in vertical dimension, which led to the collapse of oro-facial structures, and to increase after wearing complete dentures because the vertical dimension of occlusion was restored.

Keywords: Airway, edentulous, Obstructive sleep apnea syndrome

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INTRODUCTION

Obstructive sleep apnea syndrome (OSAS) is a condition marked by recurrent upper airway obstruction, snoring, and excessive daytime sleepiness as a result of apnea and hypoapnea episodes during sleep.¹ One prevalent cause of obstructive sleep apnea is claimed to be increased pharyngeal collapsibility.² It could be anatomical in nature because of diseases including macroglossia, retrognathia, micrognathia, and soft tissue hyperplasia that cause the airway's lumen to shrink, or it could be functional in origin because of muscle hypotonicity.³ A study of the literature indicates that in a patient with obstructive sleep apnea, having all of their teeth extracted worsened their cardio-respiratory symptoms and nearly doubled the frequency of apnea/hyponea episodes per hour.^{4,5}

Patients without teeth have a lower facial height and a more rotated mandible, which raises their chance of

developing obstructive sleep apnea. Obstructive sleep apnea is a prevalent condition, particularly in the senior population over 50.⁵ Obstructive sleep apnea is a condition that affects 61% of the older population. Applying prosthodontic appliances, such as tongue and mandibular repositioning devices, may be necessary as a treatment method for patients who pose a risk of surgery or who have not responded well to previous surgical operations.⁶ The present study was conducted to assess impact of denture wearing on retropharyngeal space in edentulous patients.

MATERIALS & METHODS

The present study was conducted on 50 edentulous patients of both genders. All were informed regarding the study and their written consent was obtained.

Data such as name, age, gender etc. was recorded. Patients were divided into 2 groups of 25 each. Group I were edentulous patients wearing no denture and

group II were wearing denture. Lateral Cephalograph of edentulous subjects and lateral Cephalograph of same edentulous subject wearing complete denture with acceptable vertical dimension of occlusion. Parameters such as retropharyngeal space (Mp-Lp),

posterior airway space, apw2-ppw2, and apw4-ppw4 were recorded. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 50		
Gender	Male	Female
Number	28	22

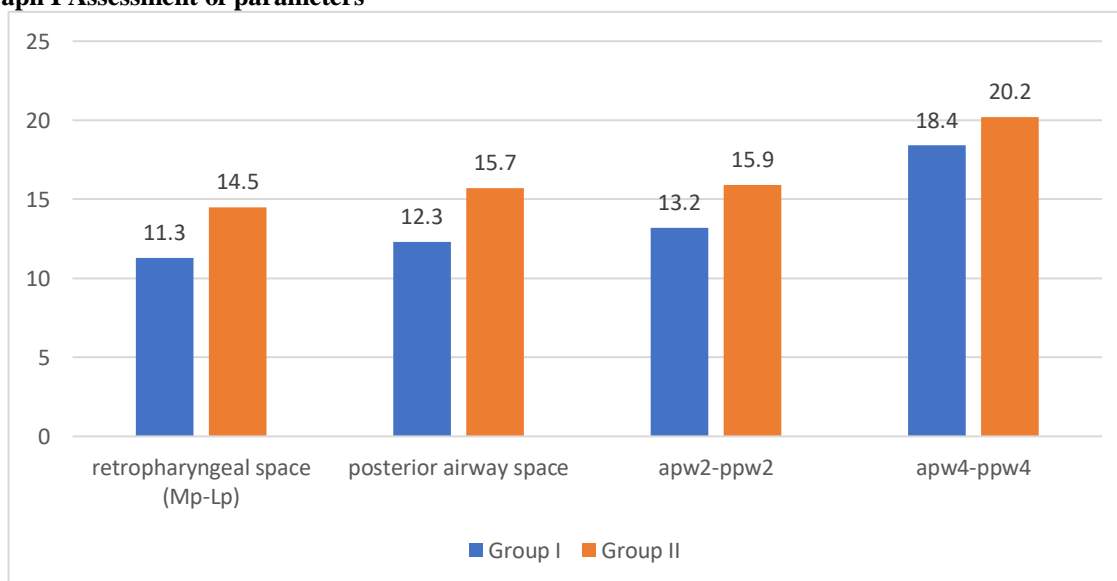
Table I shows that out of 50 patients, 28 were males and 22 were females.

Table II Assessment of parameters

Parameters (mm)	Group I	Group II	P value
retropharyngeal space (Mp-Lp)	11.3	14.5	0.04
posterior airway space	12.3	15.7	0.03
apw2-ppw2	13.2	15.9	0.05
apw4-ppw4	18.4	20.2	0.04

Table II shows that in group I and group II, the mean retropharyngeal space (Mp-Lp) was 11.3 mm and 14.5 mm, posterior airway space was 12.3 mm and 15.7 mm, apw2- ppw2 was 13.2 mm and 15.9 mm and apw 4- ppw 4 was 18.4 mm and 20.2 mm respectively. The difference was significant (P< 0.05).

Graph I Assessment of parameters



DISCUSSION

The prevalence of obstructive sleep apnea is clearly higher in edentulous patients than in the general population.⁷ Mandibular rotation, a decrease in lower face height, and alterations in upper airway size and function are observed. One essential component of the prosthodontic therapy method is the rehabilitation of edentulous patients wearing full dentures.⁸ In addition to providing aesthetics and better phonetics, a denture also improves disorders like OSA/hypoapnea, restores the intended function of mastication, and offers proper support to oro-facial tissues by correcting the changed vertical dimension of the face.^{9,10} The present study was conducted to assess impact of denture wearing on retropharyngeal space in edentulous patients.

We found that out of 50 patients, 28 were males and 22 were females. Arisaka H et al¹¹ evaluated the role of dentures on modifications in the position of the jaw, tongue, soft tissues and retropharyngeal space, thus preventing obstructive sleep apnea by restoring the lost vertical dimension. The 20 edentulous patients visiting for complete denture prosthesis were selected as subjects for this study. The same subjects were subjected to cephalometry after providing dentures with acceptable vertical dimension of occlusion and the effect of this on retropharyngeal space, posterior airway space, pharyngeal depth and readings were compared with those in edentulous group. Significant changes were observed with increase in retropharyngeal space, posterior airway space, pharyngeal depth at level of second cervical vertebrae

as compared to edentulous patients whereas no significant variations were found in pharyngeal depth at level of fourth cervical vertebra.

We found that in group I and group II, the mean retropharyngeal space (Mp-Lp) was 11.3 mm and 14.5 mm, posterior airway space was 12.3 mm and 15.7 mm, apw2- ppw2 was 13.2 mm and 15.9 mm and apw 4-ppw 4 was 18.4 mm and 20.2 mm respectively. Smith et al¹² evaluated the radiographic changes that occur in the pharynx and surrounding structures with alteration of posture from the upright to the supine position and the effect that mandibular protrusion whilst supine has on these dimensions. They involved 35 consecutively referred adults with proven non-apneic snoring. Lateral skull radiographs were obtained with the subjects upright in occlusion, supine in occlusion and supine with the mandible protruded to the maximum comfortable position. Radiographs were traced and digitized, and the pharyngeal dimensional changes and hyoid position were examined. Males and females were examined separately. Radiographic pharyngeal dimensions were changed with altered posture, resulting in significant reductions in the minimum post-palatal ($p < 0.01$) and post-lingual ($p < 0.05$) airway measurements in the supine position. Mandibular protrusion whilst in the supine position produced increases in the functioning space for the tongue.

The shortcoming of the study is small sample size.

CONCLUSION

Authors found that retropharyngeal space (RPS) and posterior airway space (PAS) were found to be reduced in edentulous subjects as a result of anatomical changes that caused a decrease in vertical dimension, which led to the collapse of oro-facial structures, and to increase after wearing complete dentures because the vertical dimension of occlusion was restored.

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