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Morphometric evaluation of soft palate in oral submucous fibrosis—A digital cephalometric study☆

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ABSTRACT

The Present study was carried out to evaluate the morphology of soft palate in Oral Submucous Fibrosis (OSF) patients using digital lateral cephalogram. A total number of 70 patients were included in the study (Control group had 35 patients and Study group had 35 OSF patients) were evaluated for soft palate by digital lateral cephalogram. The anterio-posterior length and superior–inferior length of soft palate were measured. The morphology of soft palate was categorized as type 1, to type 6. Different types of soft palate were compared with stages of OSF. Among the Study group (35 patients) 62.9% had Stage 2 OSF. Leaf shaped (Type 1) soft palate was seen commonly in stage 2 OSF whereas butt shaped (Type 3) in stage 3 OSF. In the present study there was statistically significant difference in length (anterio-posterior) of Type 1 soft palate of OSF patients. In the present study as the OSF progressed to advanced stage there was gradual change from Type 1 and Type 2 variety of Soft palate to Type 3 and Type 6 variety of soft palate. The study observed that there was gradual reduction in the length of soft palate in anterior-posterior direction in OSF patients.

1. Introduction

Oral submucous fibrosis (OSF) is a chronic progressive disorder of oral cavity, first described in the early 1950s [Tilakaratne et al., 2006]. The disease is predominantly seen in India, Bangladesh, Sri Lanka, Pakistan, Taiwan, Southern China, Polynesia and Micronesia. Several case-series are reported among Asian immigrants to the UK and South and East Africa. Recent epidemiological data indicate that, the number of cases of OSF has raised rapidly in India from an estimated 250,000 cases in 1980 to 2 million cases in 1993 [Pillai et al., 1992; Haider et al., 2000].

The hallmark of the disease is the fibrosis in the submucosal layers and the muscles of mastication leading to varying degrees of trismus. Mucosa in these individuals is white, firm, extremely sensitive to bruises, and is easily bruisable. The fibrosis of the mucosa over and around the uvula leads to certain characteristic abnormalities in the uvula, such as forward pointing uvula or a vanishing uvula [Chaturvedi, 2009].

Although in the past radiographs were used to analyse the size of nasopharyngeal area later cephalogram became import diagnostic tool to gauge hard and soft tissues [Bitar et al., 2010]. It is, however, less expensive, more useful, easily achieved with reduced radiation, and correlates with other investigation such as computed tomography (CT) [Samman et al., 2003]. Cephalometric analysis is one of the most commonly accepted techniques for evaluating the soft palate in both normal individuals and in those with cleft lip and palate [Bejdová et al., 2012; Shimomatsu et al., 2012; Heliövaara and Rautio, 2011].

However, the velar morphology, which has been ignored in the past, may be responsible for the different dimensions of soft palate [Kollias and Krogstad, 1999].

Thus there is a need to analyse the morphology of soft palate. So the present study was carried out to evaluate the morphology of soft palate in OSF patients using digital lateral cephalogram.

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2. Material and methods

The study included of 70 patients of whom 35 were control group and 35 study group. The study Group included of 35 consecutive OSF patients. Oral submucous fibrosis was diagnosed based on history and clinical examination. The OSF was staged according to Durgesh bailoor classification. Patients with known history of surgery of palate, cleft lip and palate and scleroderma were excluded from the study.

Informed consent was obtained from each patient before the Radiographs. Patients are positioned in cephalostat with Frankfort plane parallel to the floor. They are asked to swallow any saliva once to clear the oral cavity and pharynx and then to close their mouth lightly to place their upper and lower teeth in centric occlusion and with their oropharyngeal musculature relaxed. Digital lateral cephalograms were taken with KODAK 8000C System. The morphology of the soft palate on lateral cephalogram was examined. The length of the soft palate was evaluated by measuring the linear distance from the posterior nasal spine (PNS) to the tip of the uvula of the resting soft palate. Superio-inferior dimension of soft palate was measured at the thickest area of soft palate. Morphology of soft palates was classified based on their morphology according to You et al. (2008) as Types: 1 (leaf-shaped), 2 (rat-tail shaped), 3 (butt-like), 4 (straight line), 5 (S-shaped) and 6 (crook-shaped) (Fig. 1). The obtained values are tabulated and statistically analysed for its significance by student *t* test.

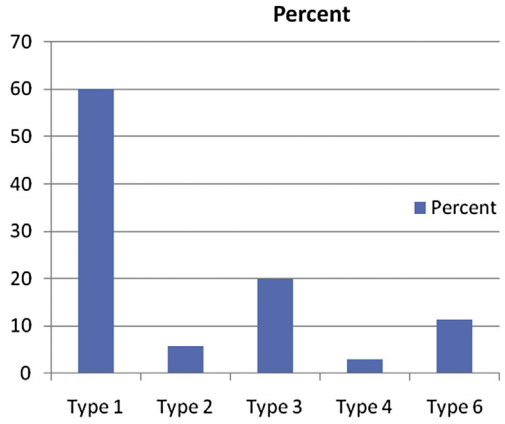
3. Result

In the present the mean age was 28 years (17–39 years). In the control group of 35 patients, 13 patients (37.1%) had Type 1 soft palate, 8 patients (22.8%) had Type 2, 4 patients (11.5%) had Type 3, 2 patients (5.8%) had Type 4, 5 patients (14.3%) had Type 5 and 3 patients (8.5%) had Type 6 variety of soft palate. Among the Study group of 35 cases, 21 patients (60%) had Type 1 soft palate, 2 patients (5.7%) had Type 2 soft palate, 7 patients (20%) had Type 3 soft palate, 1 patient (2.9%) had Type 4 soft palate and 4 patient (11.4%) had Type 6 soft palate (Table 1).

Among 35 patients of study group 22 patients (62.9%) had stage 2 OSF, 12 patients (34.3%) had Stage 3 OSF and one patient (2.9%) had Stage 1 OSF (Table 2).

Lengths of soft palate in both anterio-posterior direction and in superior–inferior directions were measured. In the Study group the mean length in anterio-posterior direction for type 1 soft palate was 31.85 mm, for type 2 it was 35 mm whereas 26.86 mm for Type 3, 24 mm and 30.25 mm for Type 4 and Type 6 respectively. Whereas the Control group had 36.72 mm, 36.44 mm, 30.22 mm, 35.72 mm, 33.1 and 32.83 mm in type 1,2,3,4,5 and 6 soft palate respectively (Table 3). The mean length in superior–inferior direction for study group was 10.38 mm for type 1 soft palate, 7.50 mm for type 2, 12.43 mm for type 3. 9 mm for type 4 soft palate. Type 6 soft palate had 10.75 mm and for Control group was 9.62 mm, 8.10 mm, 11.59 mm, 5.58 mm, 8.03 mm and 9.45 mm for Type 1, 2, 3, 4, 5, and 6 soft palates respectively (Table 4). Type of soft palate was compared with Stage of Oral submucous fibrosis (Table 5). Mean length of soft palate in anterio-posterior direction and superior–inferior direction was compared with the different stages of OSF (Table 6).

Table 1
Distribution of soft palate.



4. Discussion

OSF is predominantly a disease of the oral cavity. The common sites of involvement are the mucosa and submucosa of the soft palate, anterior faucial pillars, buccal mucosa, tongue and lips. Other sites include oropharynx and oesophagus [Misra et al., 1998]. Gupta et al. (2000) in their study on 53 patients concluded that palatal and paratubal muscles are involved the fibrosis process.

Cephalometry is a relatively inexpensive method and permits a good assessment of the soft tissue elements that defines the soft palate and its surrounding structures. Morphometric assessment of the nasopharynx or the configuration of adjacent structures can be defined in terms of depth and height in the median sagittal plane on lateral cephalogram [Bitar et al., 2010].

This paper discuss about the morphological changes of soft palate in patients with oral submucous fibrosis. Similar study was carried out in normal individuals by You et al. (2008). To our knowledge this is the first study to evaluate the morphological changes of soft palate in oral submucous fibrosis using digital lateral cephalogram. Recently there have been various reports concerning the outcomes of the airway changes in Obstructive sleep apnoea syndrome after LF III advancement evaluated using cephalometrics [Nelson et al., 2008; Flores et al., 2009].

Knowledge about the varied morphological pattern of soft palate in OSF patients can give us a clear understanding about disease progress in oropharyngeal region. Through understanding and knowledge of changes associated with OSF in soft palate will help

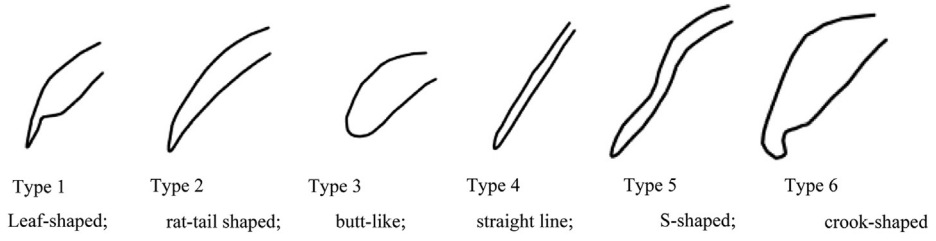


Fig. 1. Schematic representation of different types of soft palate.