ORIGINAL ARTICLE

Airway Impairment in Patients with TMJ Ankylosis - A Comparative Study

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ABSTRACT

The objective of this study was to compare the airway impairment in TMJ ankylosis patients when compared to normal group of patients. For this study, two groups were devised as group 1 (NORM, without TMJ ankylosis) and group 2 (ABNORM, TMJ ankylosis). All variables relating airway were recorded on specially designed Performa with consent. Independent T sample test was applied to derive results in mean and standard deviation. Total of 50 patients (25 Normal, 25 Abnormal) when compared showed that lower and upper pharyngeal widths were severely affected in TMJ ankylosis patients. Anteropostrior angular measurements were showing reduced mandibulars growth. Linear measurements of mandible were reduced due to ankylosis of TMJ. Neck line measurements implicated short neck and posterior positioning of mandible.

Keywords: Airway impairment, TMJ ankylosis

INTRODUCTION

Ankylosis of the temporomandibular joint (TMJ) is an intracapsular union of the disc-condyle complex to the temporal articular surface that restricts mandibular movements, including the fibrous or bony fusion between condyle, disc, glenoid fossa, and eminence[1]. Trauma is the most frequent cause of TMJ ankylosis (13-100%) followed by local or systemic infection (10-49%) and diseases (10%) including ankylosing spondylitis, rheumatoid arthritis, and psoriasis[2].

Normal airway depends upon several factors like oral (lower) and nasopharyngeal (upper) airways, appearance of face, absence of TMJ pathology (TMJ ankylosis), normal TMJ function, mouth opening of 3 finger breath, mandibulohyoid distance (6.5cm), normal morphology and growth of mandible and maxilla and neck appearance[3]. TMJ ankylosis is a serious and disabling condition as it affects all factors relating normal airway[4].

Patients with TMJ ankylosis develop obstructed or reduced oropharyngeal (upper) and nasopharyngeal (lower) airways[5], severe maxillomandibular dysplasia, convex profile, reduced mandibulohyoid distance, decreased chin to neck angles etc[6]. Decreased mouth opening causes serious problems in mastication, digestion, speech, appearance, and hygiene[7]. Overall it disturbs facial and mandibular growth, leads to acute compromise

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of the upper and lower airway invariably resulting in physical and psychological disability[6,8].

METHODOLOGY

A cross sectional descriptive study of 25 patients with TMJ ankylosis and 25 without TMJ ankylosis with age range of 10-25 years and equal gender distribution, were conducted at the Orthodontic Department of Khyber College Of Dentistry Peshawar for period of one year. Informed consent was obtained from patients on specially designed Performa. Preoperative assessment of both group of patients included Profile (straight, convex, concave) and extent of incisal opening (MIO=3 finger breath). Lateral Cephaolometric view (FIG I, II) was taken for every patient to determine the following;

- Upper Pharyngeal width (Macnamara analysis): midway from soft palate to posterior pharyngeal wall=15-20mm
- Lower Pharyngeal width (Macnamara analysis): tangential point of inferior border of mandible and tongue to posterior pharyngeal wall= 11-14mm
- Sella Nasion distance (SN length)
- Linear mandibular measurements included effective mandibular length (Articulare – Mentons =100mm, and mandibular length (gonion – gnathion =SN length + 7)
- Angular Maxillo- mandibular measurements (SNA = 80, SNB =79, ANB=1)
- Witts value =0-1mm
- Neck angles (Mento cervical angle=110-120 and Menton to Neck line Angle =120-123)
- Mandibulohyoid distance =6.5mm

All patients presented with airway impairment in TMJ ankylosis were included while airway impairment in normal group of patients was exclusion criteria.

Data collected for normal patients without TMJ ankylosis were compared to above mentioned values and entered in group 1 (NORM). Data from TMJ ankylosis patients was marked as Group 2 (ABNORM). All variables analyzed and entered in SPSS version 19.0. Independent sample T Test was applied for variables of both groups to compare the airway impairment. The results were expressed in mean and SD for both groups.

RESULTS

Among 25 patients of TMJ ankylosis (group 2, ABNORM) all patients presented with convex profile and limited mouth opening of 4-15mm. Table 1. The upper and lower pharyngeal airway was severely reduced with mean of 7.96 (SD 3.48) and 6.56 (SD 2.7) when compared to group 1 (NORM) with mean of 14.80 (SD 2.12) and 11.04 (2.36) respectively. (Table 1) The correlation of SN length to mandibular length among group 2 patients showed deficiency when compared to patients without TMJ ankylosis in group 1 (NORM) as shown in Table 2 . Effective mandibular length among group 2 (ABNORM) patients of TMJ ankylosis showed severe deficiency with mean of 72.24 (SD 12.1) when compared to normal group of patients with mean of 99.92 (SD 8.1). (Table 2).

The discrepancy in anteroposterior dimensions of maxilla and mandible in group 2 patients when it is related to group 1 patients is obvious in table 2. All this discrepancy poses severe impairment in airway. Mentocervical angle and submental to neck line angle in TMJ ankylosis patients showed the mean of 131.2 (SD 14.7) and 129 (SD 12.8). While normal (group 1) patients showed mean of 119.6 (SD 10.2) and 112.76 (SD 9.12) respectively. All above findings relates to the short neck and convex profile with severe mandibular dysplasia. The mandibulohyoid distance was also found reduced in group 2 patients when compared to normal group of patients as showed in table 2. All these analysis shows the impact of TMJ ankylosis upon the normal development of airways when compared to normal group of patients.

Table 1

Group	**Profile**	**Mouth opening**
1 (NORM)	Straight	35-40mm range
2 (ABNORM)	Convex	4-15mm range

Table 2

Airway assessment	**Group 1 (Mean, SD)**	**Group 2 (Mean, SD)**
Lower pharyngeal width	11.04 (2.3)	6.56 (2.7)
Upper pharyngeal width	14.08 (2.9)	7.96 (3.4)
Linear measurement		
SN length	103.8 (14.9)	62.24 (8.5)
G0-Gn length	70.16 (4.74)	54.40 (11.7)
Ar-Menton	99.92 (8.1)	72.24 (12.1)
Angular measurements		
SNA	83.4 (7.9)	79.0 (3.9)
SNB	79.56 (2.9)	67.4 (4.9)
ANB	2.28 (1.59)	11.36 (3.6)
Witts value	0.34 (1.4)	5.92 (3.4)
Neck line angles		
Mentocervical angle	119.9 (10.2)	131 (14.7)
Submental to neck line angle	112.7 (9.12)	129.9 (12.8)
Mandibulohyoid distance	5.6cm (1.2)	2.7cm (5.6