

# ETIOLOGY, CLINICAL AND RADIOGRAPHIC FEATURES OF TEMPOROMANDIBULAR JOINT ANKYLOSIS

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## ABSTRACT

*Objective of the study was to find out the frequency of different etiological factors, clinical and radiographic features of Temporomandibular joint ankylosis.*

*Ninety six patients suffering from Temporomandibular joint ankylosis visited Oral and Maxillofacial Surgery Department, Khyber College of Dentistry, Peshawar from December 9, 2009 to December 8, 2010 and were included in the study. Patient demographics, etiology and clinical features of the disease were noted. Orthopantomograph was taken of all patients to confirm the diagnosis and to record the radiographic findings of the disease.*

*Males were the predominant group (60.4%) as compared to females (39.6%). Trauma was the etiological factor in 88.5% cases followed by infection and inflammation. Clinical deformity was present in the form of facial asymmetry (85.4%), < 5mm inter-incisal distance (76%), disturbed occlusion (64.6%) and poor oral hygiene (78.1%). Bilateral involvement was found in 40.6% cases, left side was involved in 30.2% cases while right side was effected in 29.2% cases.*

*Radio-graphically, the disease presented in the form of mushrooming of condyle, loss of joint space, anti-gonial notch and coronoid hyperplasia.*

*Trauma is the main etiological factor for Temporomandibular joint ankylosis. Clinically the disease presents in the form of facial asymmetry, limitation of mouth opening, disturbed occlusion and sleep apnea while on radiographs, there is partial or complete loss of joint space, mushrooming of condyle, anti-gonial notch and coronoid hyperplasia.*

**Key words:** Temporomandibular joint, Ankylosis, Trauma.

## INTRODUCTION

Temporomandibular Joint (TMJ) ankylosis is one of the most common pathologies affecting the facial skeleton.<sup>1</sup> It develops as a result of trauma, inflammation, sepsis and/or systemic diseases.<sup>2</sup> Articular trauma is the basic cause of TMJ ankylosis with higher incidence in children.<sup>3</sup> If the cause is trauma, intra-

articular hematoma, along with scarring and excessive bone formation, leads to the hypomobility. Infection of the TMJ most commonly occurs secondary to contiguous spread from otitis media or mastoiditis but it may also result from hematogenous spread of infectious conditions such as tuberculosis, gonorrhoea or scarlet fever. Systemic causes of TMJ ankylosis include ankylosing spondylitis, rheumatoid arthritis and psoriasis.<sup>4</sup> The classic sign is limitation of mouth opening, gradually decreasing to 5mm or less.<sup>5,6</sup> These patients present with severe facial deformity, inability to open mouth, poor oral hygiene and inability to take food leading to psychological sufferings as well.<sup>7</sup> In the long standing cases, facial asymmetry is similar to mild hemifacial microsomia in unilateral cases and retrognathia, micrognathia or microgenia in bilateral cases, presenting with a bird face like appearance.<sup>8</sup>

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**Received for Publication:** February 18, 2013

**Revision Received:** March 8, 2013

**Revision Accepted:** March 15, 2013

The diagnosis of TMJ ankylosis is clinical backed by the results of imaging studies.<sup>9</sup> Radiographic findings include marked anti-gonial notch, enlarged coronoid process and reduced vertical ramus height on the affected side. The ankylosed mandibular condyle can be hyperplastic with irregular contours and absent joint spaces.<sup>10</sup> Treatment options for TMJ ankylosis include gap arthroplasty, interpositional arthroplasty and joint reconstruction with autogenous or alloplastic materials.<sup>11</sup>

**METHODOLOGY**

Ninety six patients with complaints of facial asymmetry and limited mouth opening, diagnosed clinically and radiographically as having TMJ ankylosis, formed the study group. They were selected from Oral and Maxillofacial Surgery unit of Khyber College of Dentistry, Peshawar. It was conducted from December 9, 2009 to December 8, 2010. Study protocol, use of data for research and risk-benefit ratio was explained to patients to take an informed and understood consent. Data were collected in a structured Proforma to find out the demographics and etiology of disease. This was followed by clinical examination to note down the clinical deformity associated with the disease and its side distribution. Vernier caliper was used to measure the inter-incisal distance (IID) in all cases.

Clinical diagnosis was further confirmed radiographically by Orthopantomograph (OPG) to find out decreased joint space, anti-gonial notch, mushrooming of condyle and coronoid hyperplasia.

**RESULTS**

In this study a total number of 96 patients of TMJ ankylosis were included out of which 58 patients (60.4%) were males and 38 patients (39.6%) were females with male to female ratio of 1.5:1. These patients had mean age of 14.13±10.69 years with age range of 2 to 65 years. Most of these patients (45.8%) were in the age range of 1-10 years. The detailed age distribution is given in the Table 1.

Traume due to fall was the main etiological factor for TMJ ankylosis as presented in Table 2 and 3. Different clinical and radiographic features were observed which are listed in Table 3 and 4. Regarding side distribution, unilateral TMJ ankylosis (right+left) was more common as compared to bilateral type, however considering individually, bilateral TMJ anky-

losis was more common as compared to unilateral right or left side (Fig 1).

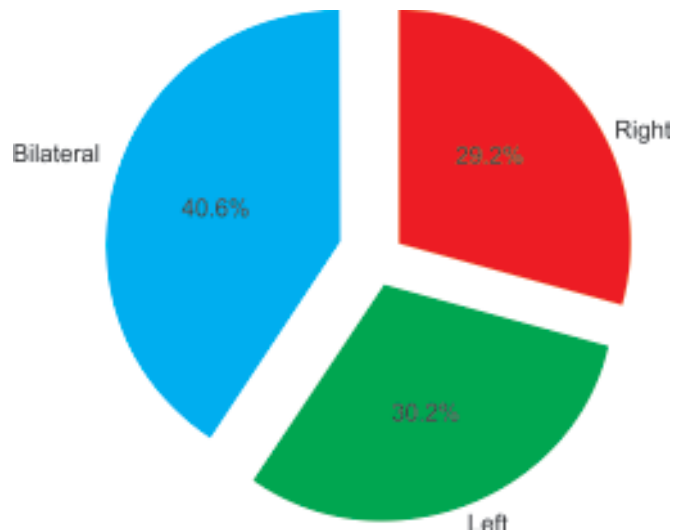


Fig 1: Side Distribution of TMJ Ankylosis

TABLE 1: AGE DISTRIBUTION

Age Range (Years)	Frequency (n)	Percentage (%)
1-10	44	45.8
11-20	35	36.5
21-30	10	10.4
31-40	4	4.2
>40	3	3.1
Total	96	100

TABLE 2: ETIOLOGICAL FACTORS OF TMJ ANKYLOSIS

Etiology	Frequency (n)	Percentage (%)
Trauma	85	88.5
Infection	4	4.2
Inflammation	1	1
Unknown	6	6.3
Total	96	100

TABLE 3: ETIOLOGICAL FACTORS FOR TRAUMA

Etiology	Frequency (n)	Percentage (%)
Fall	67	78.8
Intra-uterine trauma	9	10.6
Trauma at birth	7	8.2
Road Traffic Accident	2	2.4
Total	85	100

TABLE 4: CLINICAL FEATURES OF TMJ ANKYLOSIS

Age Range (Years)	Frequency (n)	Percentage (%)
Facial asymmetry	82	85.4
IID (<5mm)	7362	7664.6
Disturbed occlusion		
Poor oral hygiene	75	78.1
Scar on chin	51	53.1
Bulge at TMJ	38	39.6
Sleep apnea	14	14.6

TABLE 5: RADIOGRAPHIC FEATURES OF TMJ ANKYLOSIS

Age Range (Years)	Frequency (n)	Percentage (%)
Partial loss of joint space	77	80.2
Complete loss of joint space	12	12.5
Unilateral partial +unilateral complete loss of joint space	7	7.3
Mushrooming of condyle	69	71.9
Anti-gonial notch	74	77.1
Coronoid hyperplasia	46	47.9

## DISCUSSION

History of the patients revealed that trauma was responsible for TMJ ankylosis in 88.5% of the patients followed by infections and systemic diseases. It is in agreement with the worldwide studies in which trauma is found to be the main culprit for TMJ ankylosis. In the study of Kaban,<sup>12</sup> it is reported that TMJ ankylosis is associated with trauma (13-100%), infections (10-49%) and systemic diseases (10%). According to Das<sup>4</sup> TMJ ankylosis of traumatic origin ranged from 13-100% and of infections from 0-53%. Ansari<sup>13</sup> studied 189 patients and trauma came out to be the major etiologic factor in 95.7% cases and the least common cause was infection and tumors (0.5% each). In an analysis of 60 cases Ko et al<sup>10</sup> studied 45 cases of intra-articular ankylosis and found that 48.9 % were due to trauma, 15.6 % were related to middle ear or dental infections and 2.2% were cases of chronic arthritis. Topazian<sup>14</sup> results are different from these studies because he reported infections as the main cause of TMJ ankylosis. In his study 48.7% cases had history of

infections while 29.2% cases had history of trauma. Vasconcelos<sup>15</sup> reported that 60% of his patients had history of infection while 33.34% had history of trauma. The reason for higher incidence of infections in their studies in contrast to the present study may be that before the antibiotics era infections were common. But now with the discovery of antibiotics this incidence is reduced to a greater extent and nowadays trauma due to fall is the major cause of TMJ ankylosis.

In this study, 78.8% patients had history of fall from roof, bicycle, stairs or trees. In Tannkulu<sup>3</sup> study the etiologic factor was joint trauma resulting from falls in 95.8 % of the cases. Fall is also reported as a main cause of trauma resulting in TMJ ankylosis in the studies of Warraich (37.3%),<sup>16</sup> Qudah (59%)<sup>17</sup> and Khan<sup>18</sup> (66.7%) while Road Traffic Accident (RTA) accounted for 33.33%, 32% and 30% respectively in their studies. In the present study, only 2.4% patients had history of RTA which may be because of road traffic legislations with compulsory child restraints. Birth trauma accounted for 8.2% in the current study which was in accordance with the results of Cheema<sup>7</sup> (10%) and Warraich<sup>16</sup> (9.8%). Elgazzar et al<sup>19</sup> has reported that 1.8% cases are due to birth trauma. The incidence is also low in developed countries where the incidence of birth trauma varies from 0.2-1 to 2 per 1000 births as reported by Hankins.<sup>20</sup> High incidence of birth trauma in Pakistan as compared to developed nations is because of home deliveries by traditional birth attendants (TBAs/dais) and untrained midwives. Majority of population in Pakistan is living in the rural areas with difficult access to the proper health care canters so the custom of home deliveries by TBAs is very common. Other reasons for having a home delivery are family traditions and poor socio-economic conditions of the family.

Literature shows that true congenital ankylosis of the TMJ is a rare condition. Topazian<sup>14</sup> in a review of 185 cases of TMJ ankylosis documented only five cases of congenital ankylosis. Other reports of congenital ankylosis are only limited to case reports. The results of this study showed more cases of congenital ankylosis (n=9) for which no definite reason can be found. In 6.3% of the present cases no etiology was established as the causative factor was not known to the patients themselves or their parents. In all these cases with unknown etiology in the current study, the disease

was considered as secondary to some missed trauma. In the studies of Ramazenian,<sup>10</sup> Cheema,<sup>11</sup> Ansari<sup>13</sup> and Topazian<sup>14</sup> no etiology was known in 10%, 8%, 3.6% and 19.5% cases respectively.

Clinical features presented by the patients of this study were typical of TMJ ankylosis. Facial asymmetry in the form of either chin deviation or bird face appearance was present in 85.4% of patients in the present study while it was found in 71% and 21.4% cases in the studies of Vesconcelos<sup>15</sup> and Moosavizadeh.<sup>21</sup> IID distance was found to be < 5mm in 76% cases and mean was  $4.49 \pm 5.25$  mm. Ramazenian,<sup>6</sup> Elgazzar,<sup>19</sup> and Demir<sup>22</sup> have reported the mean IID of 10.7 mm, 5.3 mm and 15.2 mm respectively. It was noticed that there was scar on chin in 53.1% of the patients while it was observed in 96.7% cases in the study of Khan.<sup>18</sup> The present study showed disturbed occlusion associated with TMJ ankylosis in 64.6% patients while Moosavizadeh<sup>21</sup> has reported class II malocclusion in 43% of his cases. Shashilciran<sup>23</sup> pointed out in his study that restricted mouth opening leads to poor oral hygiene and rampant caries in patients having TMJ ankylosis, but different studies did not show any exact percentage for it. However in the present study it was observed that 78.1% patients had poor oral hygiene. In this study history of sleep apnea was noted in 14.6%. Nanaware<sup>24</sup> studied 56 patients of sleep apnea and found that in 12 patients (52.1%) it was because of some craniofacial abnormalities like TMJ ankylosis, retrognathia or micrognathia.

The radiographic findings of this study were similar to those observed by Hakim<sup>25</sup> in the form of joint deformity with loss of TMJ space, anti-gonial notch and elongation of coronoid in long standing cases. Ko et al<sup>10</sup> studied 45 patients and found that anti gonial notch was present in all subjects except for one case of hemi-mandibular hyperplasia with TMJ ankylosis. As almost all patients in this study were from poor families, so we confirmed clinical diagnosis on the basis of OPG only and CT scan was not advised to them.

Thus the clinical and radiographic features found in our study were similar to those which are peculiar to TMJ ankylosis and which have been documented in the worldwide literature.

Regarding side distribution, the results of the current study showed more cases of unilateral ankylosis (59.4%) as compared to bilateral involvement. However considering individually, there were more cases of bilateral ankylosis as compared to unilateral right or

unilateral left side. Cheema,<sup>11</sup> Ansari,<sup>13</sup> Demir<sup>22</sup> Lei,<sup>26</sup> and Nogueira<sup>27</sup> have also reported more cases of unilateral ankylosis as compared to bilateral type. However Abbas<sup>28</sup> and Walford<sup>29</sup> have reported more cases of bilateral ankylosis in their studies as compared to unilateral type. However, in systemic illnesses like rheumatoid arthritis there is bilateral symmetrical proliferative synovitis. So the side distribution will be bilateral in such cases as is evident by the results of this study 122as well, in which three out of four cases were of infection and the patient having rheumatoid arthritis had bilateral involvement. Saeed et al<sup>30</sup> has also reported that involvement of the TMJ occurs in 70% cases of rheumatoid arthritis with up to 75% of these patients showing bilateral involvement. So the disease shows bilateral distribution in systemic infections like rheumatoid arthritis.

## CONCLUSION

Due to trauma one or both joints can be involved but there is usually bilateral distribution of disease due to systemic diseases such as rheumatoid arthritis. Clinical deformity appears in the form of chin deviation towards one side or bird face appearance, limitation of mouth opening, disturbed occlusion and poor oral hygiene. Systemic involvement appears in the form of sleep apnea. In long standing cases clinical deformity is more pronounced and radiographically appears as complete loss of joint space, marked anti-gonial notch and coronoid hyperplasia.

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