

Original Research

Iatrogenic Delay in Diagnosis of Temporomandibular Joint Ankylosis: A Cross Sectional Analysis of Thirty Four Trauma Patients from Central India

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Abstract

Background: Temporomandibular joint Ankylosis is a significant problem in central India, aggravated by the delay of diagnosis due to various factors. The iatrogenic delay is a main reason why patients suffer in pain and ultimately get jaw lock due to ankylosis. **Material and Methods:** A total of 34 patients exhibited temporomandibular joint Trauma. They were distributed in three groups, first had eleven patients, who showed no evidence of any ankylosis, second ten who showed fibrous ankylosis and the third, thirteen patients who exhibited bony ankylosis. The analysis was further done that they belonged to rural group and the urban group. The former had 16 patients and latter had 18 patients. Statistical comparison of the iatrogenic delay in rural and urban group was made using the software Decision Analyst Stat™2.0. **Results:** The iatrogenic delay per doctor was 3.67 months for rural and 2.94 months in urban areas. The patients who had no ankylosis had mean iatrogenic delay of 1.85 months, Fibrous ankylosis group had mean iatrogenic delay of 2.94 months and those suffering (bony ankylosis) had mean delay of about 19.6 months. **Conclusion:** The iatrogenic delay was a key factor in neglect of the trauma patients who resulted in the fibrous and bony ankylosis. We found that (rural) patients had statistically significant delay in diagnosis as compared with the urban.

Keywords: Bony Ankylosis; Fibrous Ankylosis; Temporomandibular joint; TMJ; Trauma; Pain.

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Introduction

The urbanization and rapid migration of people from the villages to the cities has resulted in some unique health problems. Road traffic accidents are one of the traumatic problems that cause a special impact on the facial region. The delay in bringing the patients from the village to the specialty care centers was not studied in detail before this study in central India. The current study focuses on the neglect in treatment of trauma patients leading to ankylosis. Bali RK et al¹ have mentioned that Mandible was affected most commonly and that the impact on parasymphysis region was significant. The increasing prevalence of facial bone injuries emphasizes the necessity for epidemiological surveys to determine optimal prevention strategies and patient management. Another study from Varanasi India by Bhattacharya V² has suggested that aesthetics and delicate care of soft tissues will result in scar free healing. Thus the primary care dentists and physicians must be trained in soft wound care, bleeding control and the giving of anti-tetanus injections on the spot and avoid delay in proper referral. The need for the current study is to evaluate the cause of iatrogenic delay (ID) in trauma patients which lead to ankylosis.

Methods and Materials

A total of 7685 patients who attended the Oral Medicine and Radiology department were analyzed of whom the 238 patients with facial trauma were enumerated (Table 1). Alcohol was consumed by 82/238 (34.45%) of patients in this series. Thus drunken driving emerges as a vitiating factor in the road traffic accidents (RTA). The study by Bayan P et al.³ have confirmed our own findings, that almost 46.22% of the victim of road traffic accidents, admitted to use of alcohol in their series. All underwent a protocol of thorough case history, examination, orthopantomograph and additional radiographs required specially in the temporomandibular joint (TMJ) region. A detailed follow up of only 72 was possible at our Oral Medicine and Radiology and Oral and maxillofacial surgery department level and only 34 cases were finally included which fit into our study. Remaining cases were referred to the Peoples Hospital and treated by Neurosurgery and general surgery for various injuries. (Figure 1 and 2)

The average delay in time period between patient reporting with TMJ fracture and assessment of ankylosis was three months. All the statistical analysis was focused on the ID of the village (rural) and the city

(urban) patients and on the outcomes of the trauma cases.⁴ The time was calculated in months taken from primary visit to doctor to the final treatment being given at tertiary specialty hospital. This was termed as the iatrogenic delay. Considering the number of doctors in the referring chain, ID was also calculated per doctor in both the rural and urban series. Decision Analyst STAT™ version 2.00 is free software which was used

to statistically differentiate between the ID of ankylosis patients coming from rural and urban areas to our specialty hospital, in Bhopal. (Figure 4) A written consent was taken from all the patients who participated in the study and this study was certified by the ethical committee of the Peoples Dental Academy. Four representative cases are presented here for discussion.

Anatomical region	Number of patients out of 238	Percentage (%)	Cause Reported in Files
Mandible all areas	94	39.4	Two wheeler 76; four wheeler 18; Fights (assault) 06; Domestic fall 02 with Total = 111 patients. Alcohol used by 35% of above patients
Mandible condylar region	34	14.2	
Le fort I	41	13.8	Two wheeler 74; Four wheeler 40; Fights (assault) 13; Domestic fall nil with Total = 127 patients. Alcohol used by 39% of the above patients
Le fort II and III	39	16.3	
Complex fractures not classifiable	30	12.6	

Table 1: The over view of 238 patients who suffered from various injuries in the facial region.



Figure 1: The 13 year old female patient with RTA resulting in bilateral TMJ ankylosis with iatrogenic delay of 26 months.



Figure 2: The 35 year old patient with RTA resulting in right fibrous TMJ ankylosis and the iatrogenic delay of five months was noted.

Results

The post traumatic clinical outcomes of the thirty four patients resulted in ankylosis by 11 patients, 10 patients developed fibrous ankylosis of which most were males aged between 20 to 30 years and finally 13 patients developed bony ankylosis. (Figure 3)

Discussion

The facial injuries cause a lot of tissue damage and even permanent facial

deformity. The wounds are not only physical but also psychological. de Sousa A,⁵ mentions that the team involved in the treatment of facial disfigurement must have the highest standards of psycho-social rehabilitation in mind, before planning for any surgery. Shetty V, et al⁶ mentions that a large proportion of the trauma patients show acute psychological symptoms. The many young men and women who get involved in this mayhem and violence of modern times often have unresolved scars of the mind.

Jain et al⁷ in a retrospective study of 44 patients in Uttar Pradesh, India presented a broad overview of the management of TMJ ankylosis. TMJ ankylosis was primarily attributed to delay in availability of surgical expertise and prolonged non-usage of the joint due to pain after injury.

The greatest majority of patients with this problem are referred from rural areas, where the early diagnosis and primary care of fractures of the mandibular condyle are either missed or treated inappropriately leading to psychological distress.⁸ The economic status of the patients and unavailability of trained medical specialists have major role in delaying treatment.⁸ Majority of the patients (81.7%) presenting with post traumatic TMJ ankylosis were uneducated, lacked self-awareness, had poor economic status and had limited access to concerned professional health workers and trained specialist. (Figure 5)

Our figures of 59/76 (77.63%) patients of mandibular trauma were from poor socio-economic class and from villages which compares well with figures emerging from Pakistan.⁹ This study also clearly depicts that the ID in the rural side was significantly different from the urban side. In India also the lack of education, lack of facilities to travel especially in central India and increasing level of road traffic accidents made access to surgical care difficult. Chanchalani R et al.,⁹ also conducted a study in Bhopal and found that in the road traffic accidents the highest number of victims (61.50%) belongs to 15-35 years of age group. Hameed H and Qiam ud Din¹⁰ have brought out some startling factors in their study of the delayed consultation. They state that 23.3% of their patients did not consult any health care professional at all. Their conclusion of poverty, illiteracy and lack of referral being primary cause of TMJ ankylosis was strongly confirmed by our own study, especially in the rural regions. The mean ID in our study was 19.6 months in rural regions but their mean delay was in years 9.1 year plus/minus 9.05 years. Considering the backwardness of the Peshawar region of Pakistan such long delays indicate need for more health care awareness.

Trauma is the predominant causal factor for temporomandibular joint ankylosis. However, the relationship between condylar fracture and TMJ ankylosis is complicated. It

is believed that post-traumatic TMJ ankylosis arises from TMJ intra-capsular changes, including damaged cartilage, displaced or disrupted discs, hematoma formation and subsequent fibrosis and calcification in the joint.¹⁰ Failure to recognize the presence of a condylar fracture may translate into late complications, including facial deformity due to aberrant growth and temporomandibular joint ankylosis.⁷

In our study it was found that in 46.1% of patients, mandible is the most commonly affected site with 25% of condylar fracture noted (Table 2 and 3) and majority of them were on 2 wheelers rather 4 wheeler and 37% of them were alcohol abusers. Of total cases 18 were from city and 16 from the rural areas more than 40kms away from Bhopal. It was found that increasing iatrogenic delay of each patient was the major cause of ankylosis whereas delay above in getting professional help of a trauma center developed bony ankylosis. (Figure 6)

Sl. No.	Age	Sex	Cause Reported	Fracture
1	11	F	Fall	Left Condyle
2	18	F	RTA	Right Condyle
3	22	F	Fall	Bilateral Condyle
4	30	M	RTA	Left Condyle
5	40	M	Assault	Left Condyle
6	40	M	RTA	Left Condyle
7	18	F	RTA	Right Condyle
8	13	F	RTA	Bilateral Condyle
9	13	F	RTA	Right Condyle
10	28	M	RTA	Right Condyle
11	13	F	RTA	Right Condyle
12	26	M	RTA	Left Condyle
13	28	M	RTA	Right Condyle
14	30	M	RTA	Left Condyle
15	40	M	Assault	Left Condyle
16	40	M	RTA	Left Condyle

Table 2: The most commonly involved fracture sites in rural population.

The age group of 15-29 years has been found to be most vulnerable in the study by Biswari G et al¹¹ and they confirm our study findings about alcohol abuse playing a major

role in both road traffic accidents and inter-personal violence.

Rural	Diagnostic delay (months)	No of doctors seen	delay per doctor
R	26	7	3.71
R	12	6	2.00
R	18	5	3.60
R	19	4	4.75
R	16	4	4.00
R	22	4	5.50
R	21	7	3.00
R	14	4	3.50
R	16	4	4.00
R	14	4	3.50
R	19	4	4.75
R	26	7	3.71
R	32	7	4.57
R	17	5	3.40
R	19	8	2.38
R	32	7	4.57
Average delay per doctor / Rural			3.67
Urban	Diagnostic delay in months	No of doctors seen	Delay per doctor
U	4	2	2.00
U	8	2	4.00
U	5	3	1.67
U	3	2	1.50
U	9	2	4.50
U	8	2	4.00
U	5	3	1.67
U	4	2	2.00
U	5	3	1.67
U	9	2	4.5
U	5	3	1.67
U	4	2	2.00
U	9	3	3.00
U	8	2	4.00
U	5	3	1.67
U	9	2	4.5
U	5	3	1.67
U	4	2	2.00
Average delay per doctor urban			2.94
Average delay of patients rural	19.6 months		Average delay per doctor in rural
Average delay of patients Urban	6.16 months		Average delay per doctor in urban

Table 3: Showing the urban / rural ankylosis patients with iatrogenic delay- calculated in two ways. A total 16 rural patient's delay was averaged. A total 18 urban patient's delay was averaged. Then the delay caused by each doctor in the referral chain was calculated.

In a Study conducted by Khan et al¹² it was demonstrated that fact 33.3% of our patients did not consult health professionals because of their negligence/ lack of awareness (60%) and poverty (40%). Khan, have also noted that these factors are the main cause of late

diagnosis in Pakistan. In Khan's study, 88.3% of the patients belonged to a lower middle class family and 11.7% were from a middle class family. Most of the (81.7%) patients with TMJ ankylosis were uneducated.¹³

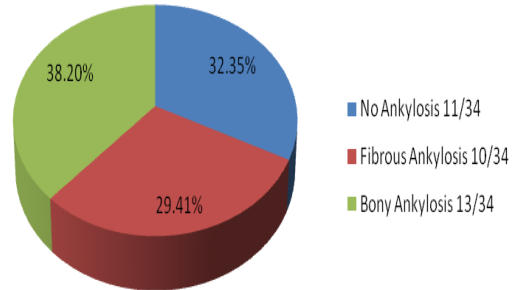


Figure 3: the post traumatic clinical outcomes of the 34 patients of condylar fracture.

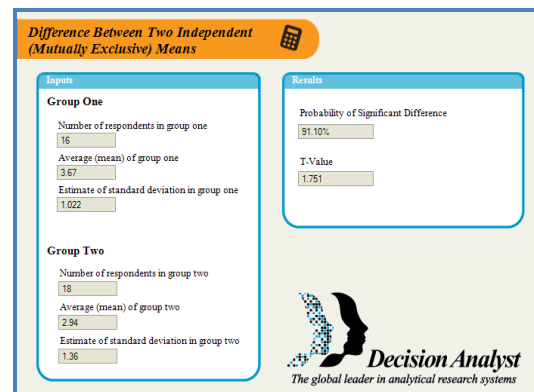


Figure 4: Shows the probability of significant difference between the ID per doctors 91.10% at T value of 1.751 between the Rural and Urban series. The difference is only weakly significant. This was done using Decision Analyst™ 2.0. This means that the delay per doctor in rural and urban areas was not significantly different.

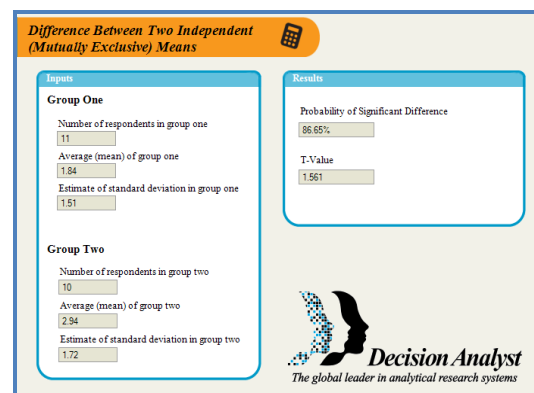


Figure 5: Showing the probability of significant difference (POSD) between the ID of clinical outcome of no ankylosis Group One (11 pts) to the Group Two series which showed the Fibrous Ankylosis group (10 pts)

– POSD of 86.65% weakly significant. ID was not significantly varying as per the non ankylosis and the fibrous ankylosis patients.

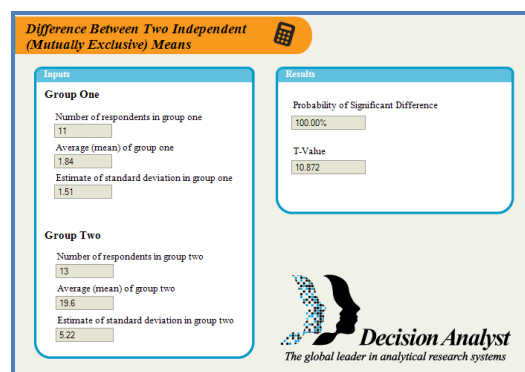


Figure 6: Showing the comparison between the Group One No ankylosis group (11 pts) and the Group Two bony ankylosis group (13 pts) for POSD in the ID recorded in months. The T value of 10.87 and the probability of significant difference at 100% means that ID was a very important factor in

the neglect of TMJ trauma and its subsequent conversion into bony ankylosis.

Jha BK¹³ has mentioned that Indore with a high density of vehicles accounted for the maximum number of 711 fatalities in road accidents in the state during the year followed by Bhopal and Gwalior. Interpersonal violence and RTA were the two most stated causes for the facial fractures as per the study by Nakhgevary KB.¹⁴ He emphasized that alcohol consumption brought out aggression and was the primary risk factor. Our study confirms that 35% of patients with history of mandibular fractures showed evidence of alcohol consumption and analysis into causes 76% was RTA by two wheelers. Chandrashekar & Reddy¹⁵ also confirmed influence of alcohol in 58% of patients in their series and two wheelers were most commonly used vehicle types. Thus use of two wheelers and alcohol emerged as major risk factor in India for this problem.

Type of Presentation	Rural	Urban	Iatrogenic Delay	Remark
No Ankylosis	1	10	1.84 months	Least delay showed no ankylosis
Fibrous ankylosis	4	6	2.94 months	3 months of delay showed fibrous ankylosis
Bony ankylosis	12	1	19.6 months	19 months of delay confirmed bony ankylosis

Table 4: The three clinical outcomes analyzed. No Ankylosis in spite of the condylar trauma in 11 patients; fibrous ankylosis in 10 patients and bony ankylosis 13 patients were noted. The mean iatrogenic delay (ID) in three groups with minimum in no ankylosis group and maximum in bony ankylosis group was depicted.

Summary and Conclusion

Unlike in most developed countries where assaults have replaced road traffic crashes as the major cause of the injuries, in India no apparent shift from RTA as the leading cause of maxillofacial injuries was observed. Ignored or mismanaged trauma to the joints in growing age is the major cause of TMJ ankylosis. Delay on part of rural patients was pronounced is because of poverty, lack of awareness and illiteracy. The importance of knowledge and practice of road safety measures needs to be emphasized in the prevention of RTAs. The study by Kulkarni et al¹⁶ from Mangalore cogently demonstrates its importance. This study found that ID in months strongly affected the outcome for the TMJ trauma patients whether they heal with no loss of mouth opening (Mean ID=1.85), or they have fibrous ankylosis (Mean ID=2.94) or they have bony ankylosis (Mean ID=19.6).

We found that the doctors delay (iatrogenic delay in rural side of central India was (significantly strong) proved statistically, and this issue needs to be addressed through health education. The delay per doctor (iatrogenic delay per doctor) was not different statistically between the rural and urban central India as per our data. Thus awareness program should be undertaken and timely specialist aid provided. This will definitely decrease the prevalence of ankylosis in rural India.

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