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ORIGINAL ARTICLE

Frequency and Pattern of Presentation of Mental Nerve Injury During Para Symphysis Fracture

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ABSTRACT

Aim: The mandibular fracture at the parasymphysis is the most often seen fracture of a facial bone. The occurrence of anaesthesia or paraesthesia in the skin and mucous membrane within the distribution of the mental nerve may be seen due to mental nerve injury resulting from fractures in the Parasymphysis region. This condition has the potential to impact the overall well-being of affected individuals.

Objective: To determine the Frequency and pattern of presentation of mental nerve injury during Para symphysis fracture.

Method: The present research is an observational and descriptive investigation including a sample of 65 patients diagnosed with parasymphysis fracture. The study was done at the Nishter Institute of Dentistry in Multan, Pakistan, spanning from September 2021 to February 2023.Following the endorsement of the research by the Ethical Review Board of the hospital, patients were recruited using a non-probability sequential sampling method. The researchers used clinical neuro-sensory testing (NST) as a means of evaluating nerve damage and determining the specific kind of neurosensory impairment that occurred subsequent to a para symphysis fracture. A specifically prepared proforma is used as a tool for data collecting. The data underwent statistical analysis, and findings and observations were derived from the analysis.

Results: The study assessed the incidence of mental nerve damage in instances with Para symphysis fracture, revealing that 23 cases (35%) exhibited the presence of mental nerve injury, whereas it was missing in 42 cases (65%). The study observed a total of 23 individuals, consisting of 17 males and 6 females, who were diagnosed with mental nerve damage. The most often encountered neurosensory problems experienced by patients after surgery are paraesthesia. Additionally, it has been shown that the leading cause of parasymphysis fracture in both males and females is road traffic accidents (RTA).

Conclusions: Road traffic accidents (RTAs) have been identified as a significant factor contributing to parasymphysis fractures. These fractures may result in the development of neurosensory deficits either as a consequence of the initial trauma or as a complication after surgical intervention. It has been seen that such fractures can lead to persistent complications and a decrease in overall quality of life. Additionally, it is essential to conduct additional research studies that cover a longer duration and include a bigger cohort of patients.

Keywords: Mandibular fracture, Mental nerve, Paraesthesia, Trauma

INTRODUCTION

According to the cited source, a range of 0.2% to 8% of reported injuries are specifically related to the face [1]. Mandibular fractures are very prevalent in the maxillofacial region, ranking as the top or second most common facial bone fractures. They occur at a rate twice as high as midface bone fractures, behind only fractures of the nose [2]. Approximately 38% of all facial bone fractures occur with this frequency[3]. Fractures of the mandible are the predominant kind of trauma often addressed by oral and maxillofacial services[4]. There are several categories pertaining to mandibular fractures.[5]. Based on anatomical location, the mandible may be classified into many regions, including the symphysis, parasymphysis, body area, angle region, ramus region, condylar process, and coronoid process[6].

The mandible is involved in about 70% of all face fractures (7). Parasymphysis fractures are the most often seen kind of fractures, accounting for a prevalence rate ranging from 35% to 50%[8]. Face fractures are often seen among young individuals as a result of incidents such as falls, sports-related injuries, and automobile accidents[9]. Mental nerve injury often occurs as a consequence of mandibular fractures that are associated to the parasymphysis.[10].

Nerve injury resulting from a fracture may lead to a modified neurosensory function, characterised by anaesthesia or paresthesia of the skin and mucous membrane in the area supplied by the mental nerve. [11]. However, it is worth noting that this condition often exhibits a gradual improvement over time. Step abnormalities occur due to fractures in the mandibular para-symphysis, leading to the loss of occlusion. The presence of compression pressures exerted on the inferior border and tension forces applied to the superior border results in a propensity for the segments to separate, leading to the formation of a gap or step[12].

Historically, the treatment of mandibular fractures included the use of maxillomandibular fixation and closure reduction techniques. The subsequent procedures in the management of mandibular fractures included open reduction and wire osteosynthesis[13]. Subsequently, the use of open reduction and internal fixation using titanium hardware, such as lag screws and plates, superseded wire osteosynthesis as the preferred approach for managing fractures[14]. Furthermore, there have been modifications made to the technique of rigid plate fixation in the treatment of these fractures, including the use of progressively smaller plates and reduced compression[15].

The optimal approach for treating parasymphyseal fractures is now under active investigation [16]If mandibular fractures in this particular location are not appropriately managed, individuals may be susceptible to facial widening and malocclusion[17]The current methodology for the open reduction and internal fixation of these fractures has been influenced by the contemporary comprehension of the biomechanics and fracture healing processes of the mandible[18]. Schede is recognized for his use of a steel plate affixed to the mandible during the latter part of the 1880s, so pioneering the first application of mandibular bone plating. The technique of external fixation was first reported by Vorschutz in 1934, who used plaster and transdermal bone screws for this purpose[19]. The adverse consequences of facial trauma include post-traumatic mental nerve damage diseases, which can lead to a worse quality of life for affected individuals. This article provides a summary of the frequency and pattern of presentation of mental nerve damage in relation to its contribution to the effective management of mandibular fractures.

MATERIAL & METHODS

The present research is an observational and descriptive investigation including a sample of 65 patients diagnosed with parasymphysis fracture. The study was done at the Nishter Institute of Dentistry in Multan, Pakistan, spanning from September 2021 to February 2023.Following the endorsement of the research by the Ethical Review Board of the hospital, patients were recruited using a non-probability sequential sampling method. The research

included all participants, irrespective of their age or gender. This study includes all reported instances that include both medicolegal and non-medical legal reporting, and have sufficient data available. Exclusion criteria were used to case records without sufficient data and those reporting fractures other than parasymphysis. The patient's guardian provided informed permission subsequent to a comprehensive explanation of the study methodology, the utilisation of data for research purposes, and an assessment of the risk-benefit ratio. Demographic information pertaining to the patients, such as age and gender, was gathered. The patients had examination after their injuries, and the results of the first evaluation were documented. The patients in the study had surgical intervention for the management of displaced parasymphysis fractures. These fractures were treated using a variety of treatment protocols, which included open reduction and internal fixation. The surgical procedures were performed by a team of surgeons. Subsequent assessments were conducted at intervals of 1, 6, and 12 weeks after the implementation of the reduction intervention. A final evaluation was performed at the last follow-up session. The recovery of mental nerve functions in patients was assessed by the use of sharp/blunt differentiation, using a dental probe's sharp end and a cotton roll. The obtained findings were thereafter compared to the same region on the unaffected side. Patients were diagnosed with mental nerve injury if they reported experiencing anaesthesia or hypoesthesia (numbness) in the lower lip area on the affected side. The data underwent statistical analysis, leading to the formulation of findings and observations. The data analysis included the use of t-tests and chi-square tests.

RESULTS

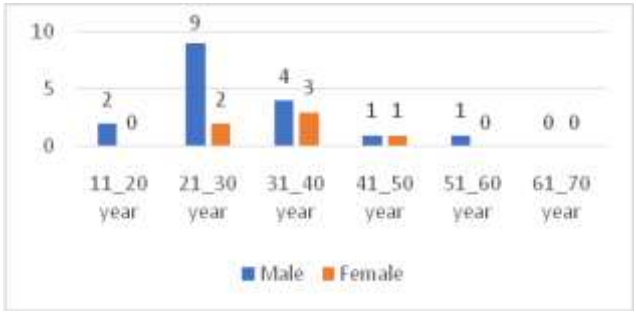

Figure 1: Age range of the patient at the time of injury (in years).

This research investigated the prevalence of parasymphysis fractures across various age groups. The results of the study indicated that the age group between 21 and 30 years had the highest prevalence of parasymphysis fractures with concurrent mental nerve injury, with a total of 11 instances. On the other hand, individuals within the age range of 31-40 exhibited the second greatest prevalence of parasymphysis fractures, amounting to a cumulative count of 7 instances.

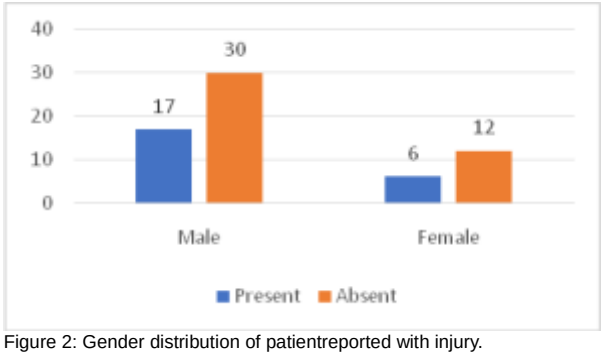

Figure 2: Gender distribution of patientreported with injury.

The current research aimed to assess the incidence of parasymphysis fractures in both men and females. The findings revealed that the frequency of parasymphysis fractures was higher in males compared to girls. A study revealed that out of the total number of patients diagnosed with mental nerve damage, 23 individuals, accounting for 35% of the sample, were affected. Among these patients, 17 were male and 6 were female. Mental nerve damage is not seen in 42 out of 65% of the cases.

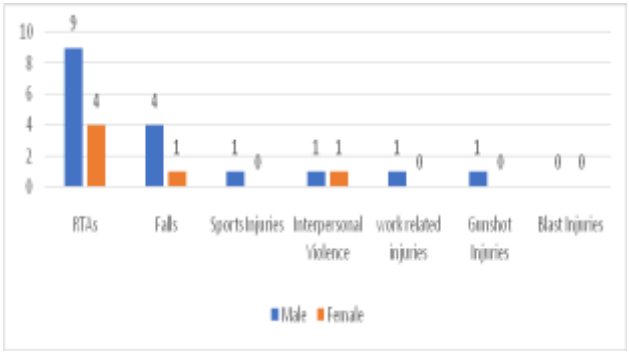

Figure 5: Etiology of Nerve Injury

The study assessed the number of patients affected by different etiological causes and determined that road traffic accidents (RTAs) were the predominant cause of parasymphysis fractures and mental nerve injuries in both male and female individuals. Falls rank as the second most prevalent source of mental nerve damage.

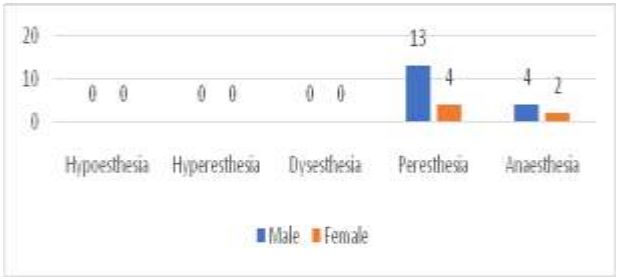

Figure 6: Number of patients having neurosensory disturbances pre-operatively

This research aimed to assess the recovery of patients from neurosensory disturbances after surgery. The results revealed that the most often encountered problem among the respondents was Paraesthesia, while the second highest occurrence was Anaesthesia. The study assessed the incidence of neurosensory disturbances in a population of patients during a one-year duration. The findings revealed that 13 male patients and 4 female patients were diagnosed with neurosensory disturbances, including paresthesia. Additionally, 4 male patients and 2 female patients experienced anaesthesia as a neurosensory disturbance.

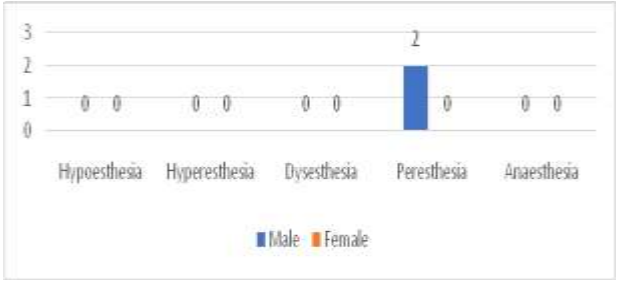

Figure 7: Number of patients who had developed neurosensory disturbances only during post-operative phase

This research aimed to assess the incidence of neurosensory abnormalities in patients after surgery during a one-year period. The findings revealed that two male patients had paresthesia throughout the post-operative phase.

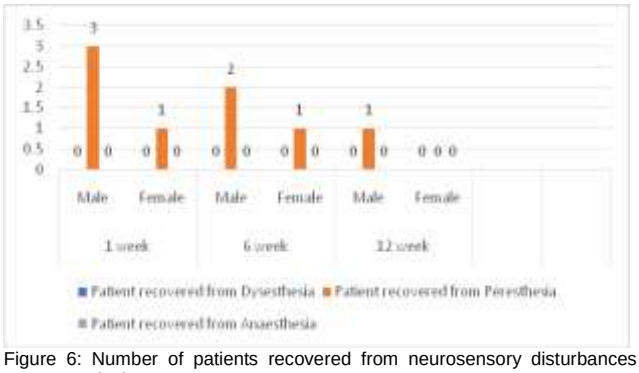

Figure 6: Number of patients recovered from neurosensory disturbances post-operatively

The objective of this study was to evaluate the prevalence of neurosensory anomalies among patients after surgical procedures over a span of one year. The results of the study indicated that two male participants had paresthesia consistently over the post-operative period.

DISCUSSION

Facial injuries account for a range of 3.2% to 8% of the total injuries seen[1]. Despite its robustness, the mandible is often reported as the most commonly fractured facial bone, ranking either first or second in terms of frequency. Different populations throughout the globe display diverse patterns of facial injury, and thus, the treatments also differ[2].The observed disparities may be attributed to the heterogeneity in economic and social conditions, local cultural practices, and legal frameworks[3]. The use of comparative data from other countries may contribute to a more comprehensive comprehension of facial trauma prevalence in diverse regions. This, in turn, facilitates the refinement of therapeutic approaches and the improvement of patients' overall well-being[4].

Mandibular fractures may be classified according to the kind of fracture, aetiology, or anatomical site of the fracture[5]. Damage to the mental nerve is a common adverse outcome associated with mandibular fractures, especially those occurring in the parasymphysis, angle, and body regions [6].

The literature has provided estimates for the prevalence of disability before to therapy or after an accident, ranging from 5.7% to 58.5%.[20]. The occurrence of anaesthesia, paresthesia, or dysesthesia in the skin and mucous membrane within the distribution of the mental nerve on the side of the fracture is a common observation in mandibular fractures located at the parasymphysis area. However, it is important to note that this condition typically exhibits a progressive improvement over time. However, the most common outcome after injury is skin anaesthetic[21].

In relation to the whole patient population diagnosed with parasymphysis fracture in the present investigation, it was observed that male patients had a greater prevalence of masculine characteristics. Out of the total number of persons diagnosed with parasymphysis fractures, six were identified as female, while the other 17 individuals were identified as male. On average, the male to female patient ratio was determined to be 3:1 [23].

Based on previous studies, it has been shown that persons falling within the age range of 11 to 44 constitute around 74.5% of the total occurrences of mandibular fractures[24]. The results of the research conducted by R. Schön et al. align with the findings of the present investigation, which revealed that 26% of individuals diagnosed with mandibular fracture fell within the age range of 30-39, while 49% of patients diagnosed with mandibular fracture were aged between 20 and [25]. The current research examined the age distribution of patients diagnosed with parasymphysis fracture at the time of injury. It was observed that the most often encountered age group was 21-30 years, followed by the 31-40 age group.

The research conducted by R. Schön et al. revealed that among a total of 114 cases, a significant majority of 89 persons diagnosed with mandibular fractures had a documented history of assault as the main cause of the trauma. This finding accounted for about 83% of all observed fractures. In the research conducted by Bede et al., it was noted that among a total of 52 patients, a significant proportion of individuals had experienced various forms of traumatic incidents. Specifically, 16 patients (30.7%) reported being subjected to physical attack, 14 patients (26.9%) had encountered incidents using projectiles, and 12 patients (23%) had been involved in road traffic accidents[26]. The present study's analysis indicated that parasymphysis fractures were mostly caused by road traffic accidents (20%), with falls (5.9%) and blast injuries (2.9%) being less frequent causes. The predominant factor contributing to the majority of road traffic accidents (RTAs) is the availability and proximity of healthcare facilities in relation to the national route.

Among the sample of 65 participants included in the present study, it was found that 23 people, constituting about 35% of the total sample, had symptoms of mental nerve hypoesthesia or sensory impairment. The aetiology of mental nerve damage may include several factors, such as direct nerve involvement inside fracture lines resulting in subsequent dislocation, traction, or compression, compression caused by soft tissue edoema, or indirect traumatic injury to the nerve bundle[27]. The adverse consequences of facial trauma include the development of posttraumatic diseases within the neurological system[28]. If a two-point discrimination test revealed the ability to identify a loss or changed sensation across its distribution, it was inferred that there were sensory abnormalities in the mental nerve[29]. In order to establish internal control in the assessment of two-point discrimination, the unaffected side was used for comparison purposes[30]. Patients were classified as having had mental nerve injury if they reported experiencing anaesthesia or hypoesthesia (numbness) in the lower lip area on the affected side[31].

CONCLUSION

The mandibular fracture is considered one of the most common facial bone fractures, ranking either first or second in frequency. This high occurrence may be attributed to its conspicuous and exposed location within the facial structure. Mental nerve damage is a common consequence of mandibular fractures that occur in the parasymphysis area. Nerve damage may lead to a modified neurosensory function characterised by anaesthesia or paresthesia of the skin and mucous membrane in the area supplied by the mental nerve on the fractured side. However, it is often seen that this condition tends to progressively recover over time. Road traffic accidents (RTAs) have been identified as a significant contributing factor to para symphysis fracture. This kind of fracture may lead to the development of neurosensory deficits either as a result of trauma or as a complication after surgical intervention. The presence of these fractures has been associated with a range of adverse consequences and a decrease in overall quality of life. Additionally, it is essential to conduct additional research studies that cover a longer duration and include a bigger cohort of patients. Additionally, it is essential to do additional study including a larger sample size of patients and a longer duration of time.

Conflict of interest: Nil
Funding source: Nil

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