

The Treatment of Temporomandibular Joint Dislocation during Covid-19 Pandemic: Result for 8 Patients in Central Sulawesi Tertiary Care Center

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Abstract

Temporomandibular joint dislocation is one of the emergency cases and requires immediate management because it causes pain and discomfort in the patient. Various causes are the pathophysiology of dislocations ranging from opening the mouth that is too wide unintentional to trauma to the jaw involving the temporomandibular joint.

We present eight cases of TMJ dislocations identified and treated in Central Sulawesi tertiary care center. (Undata Hospital, Indonesia). We describe the chief complaint, diagnosis, and management of the patients during pandemic from March 2020 to March 2021.

Temporomandibular joint dislocation is one of the cases in the emergency setting in our hospital that managed with specific technique and performed with prevention protocols according to WHO and CDC standards.

Case report (J Int Dent Med Res 2022; 15(3): 1298-1304)

Keywords: Temporomandibular Joint, Dislocation, Covid-19, Reposition, Recumbent Technique.

Received date: 07 March '022

Accept date: 19 May 2022

Introduction

According to the American Academy of Orofacial Pain, temporomandibular disorders (TMD) is defined as a group of disorders, chief complaint and clinical manifestations involving the temporomandibular joint, the masticatory musculature, including surrounding bony and soft tissue components, this condition associated with morphologic and functional deformities that affect up to 25% of the population.^{1,2} Signs and symptoms related to TMD include TMJ sounds, orofacial pain, and a restricted range of motion. There are three most common temporomandibular disorders. They are myofascial pain and dysfunction, degenerative or inflammatory joint disease (osteoarthritis), and TMJ functional derangement including

mechanical interference, restriction of the normal movement or hypermobility disorders (dislocation). In the past, TMD was considered the predominant musculoskeletal disorder. Currently, myalgia and TMJ arthralgia are associated with headaches^{3,4,5,6,7}

The prevalence of TMD was different in each country. Studies conducted on adolescents showed the prevalence of TMD was 46.1% in Mexico, 68.6% in Jordan, 77.8% in Sudan, and 15% in India. In adults, the prevalence rate of TMD was 61.3% in Korea, 33.3% in China, and 10.8% in the United Arab Emirates. Furthermore, the prevalence rate of TMDs among the elderly population showed at 33.1% in Mexico and 68% in Indonesia.⁸

One of the common problems in temporomandibular joint is dislocation. Dislocation of the TMJ is a condition in which condylar processes does not reverse and dislodge from its normal position in the glenoid fossa to the articular eminence. This condition can occur in the anterior, posterior, medial or lateral direction. The incidence of TMJ dislocation 5.3 in 100.000 emergency and account for 3% of all documented dislocations. The survey which conducted in Germany, found that at least 25 per 100.000 population each year.^{9,10} TMJ

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dislocations can be subdivided into partial or complete, acute, chronic or recurrent, bilateral or unilateral.^{11,12}

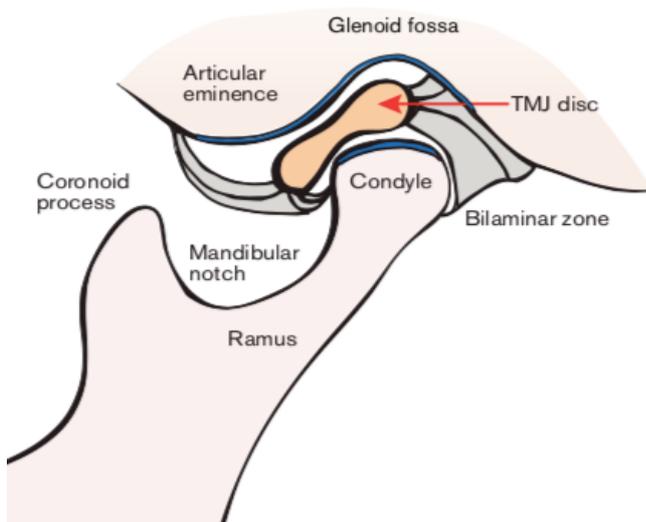


Figure 1. The anatomy of temporomandibular joint.⁽¹⁾

Etiology and Pathogenesis

TMJ dislocation commonly occurs when the condylar processes of the mandibula displaced from the glenoid fossa and anterior to the articular eminence, nevertheless the posterior, lateral and superior dislocations also reported. The etiology of this condition is multifactorial, predisposing factors for TMJ dislocation include extreme mouth opening during physiologic activity (yawning, laughing, singing, and sneezing), iatrogenic (dental or endotracheal intubation procedure using laryngoscope), trauma, joint hypermobility associated with systemic diseases with decreases in collagen synthesis such as Marfan's and Ehlers-Danlos

syndromes, birth-related or congenital joint weakness, medications with extra pyramidal effect (antiemetics like metoclopramide, propranolol), neurological and neuromuscular disorders.⁽⁹⁾⁽⁶⁾⁽⁸⁾ Beside that mandibular hyperextension and muscular forces from seizure activity, severe tooth loss resulting lack of posterior dentition supports, and anatomical variations (bony morphology or elongation of the articular eminence) are also regarded a triggering and predisposing factors for dislocation condition.^{13,14,15,16}

Some clinicians propose the abnormality in soft tissue around the TMJ in its pathogenesis, like frailty of the ligaments. Chronic recurrent condition can be associated with neuromuscular condition. The position of the condyle process anterior to the disc has also been proposed to be a factor precipitating of pseudo TMJ dislocation.¹⁷

Clinical Features/Symptoms

Determine the clinical diagnosis of TMJ dislocation is uncomplicated. Sometimes we need to confirmed the clinical findings with TMJ radiography.

TMJ dislocation characterized by painful limitation of joint mobility, impairment of speaking and chewing, there is inability to close the mouth after wide opening. Unilateral case associated with an anterior open bite and/or lateral deviation of the mandible. A depression in the preauricular region and condyle position on the anterior of the joint revealed on palpation examination.^{10,14}

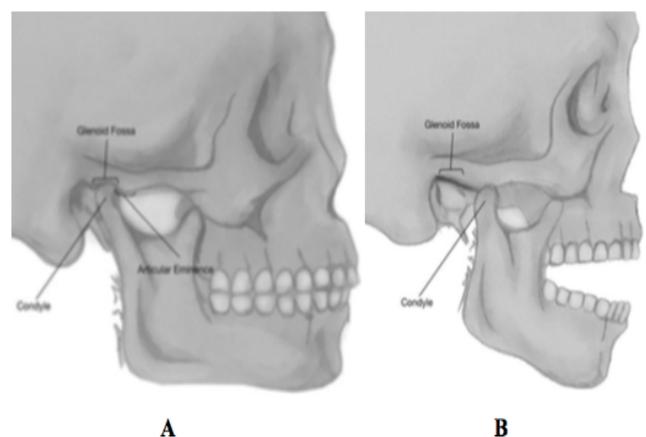


Figure 2. The illustration of TMJ, condyle in the glenoid fossa (fig 2A). Anterior dislocation of the TMJ; condyle is anteriorly displaced from the glenoid fossa (fig 2B). Illustrations provided by Nicole Eaton⁹.

Diagnosis and Classification

The basic symptoms of temporomandibular joint dislocation are inability to close the mouth and impaired occlusion which associated with pain. On the clinical assessment, we may find the empty temporomandibular joint socket by palpation (Figure 3) and analyze the temporomandibular joint sound of the patients by auscultation (Figure 4). Finally, we determined an accurate diagnosis after confirmed by radiograph (plain radiograph, CT or MRI).^{6,8,25} Panoramic, transpharyngeal, transcranial, and submentovertex views are diagnostic imaging modalities which can be used to diagnose TMJ dislocation. If plain radiograph shows inadequate views, CT-scan modality can be used to help evaluate the TMJ. Magnetic Resonance Imaging (MRI) commonly used to evaluate the internal derangement and chronic condition of TMJ.⁹



Figure 3. Clinical assessment by palpation of the temporomandibular joint.¹⁸



Figure 4. Auscultation of the temporomandibular joint to reveal joint sounds.¹⁸

TMJ dislocation can be classified into acute, recurrent, and chronic condition. Huang et al defined chronic dislocation for acute dislocation which inadequately treated for 72 hours or more.^{13,14} Acute TMJ dislocation is the condition when the condylar process displaced from its position in the glenoid fossa and results in the inability to move in its position automatically.¹⁹ TMJ dislocations can be anterior, posterior, medial, lateral, or superior to the glenoid fossa. In addition, dislocations can be involved bilateral or unilateral, it can be also classified as partial (subluxation condition), when the mandibular condyle reducible spontaneously to the glenoid fossa. Complete dislocation (luxation), when one or both mandibular condyles remain dislocated.^{9,20}

The other clinician (*Akinbami*) had been divided the TMJ dislocation into three categories; Type I defined when the condylar exactly under the tip of articular eminence, if the condylar position in front of the tip of articular eminence were classified into type II and III (higher than type II).¹⁶

Management of Temporomandibular Joint Dislocation

The treatment of TMJ dislocation should be performed immediately. If it is late, spasm of pterygoid and masseter muscles as the effect of delayed treatment can make reduction more complicated.¹⁶

The fundamental objective of treatment for TMJ dislocation to restore the normal position and function of TMJ, reduce pain, and increased patient's quality of life. The optimal treatment of acute TMJ dislocation is early reduction with different techniques to avoid the chronic condition and complication. Several methods can be used to reduce anterior TMJ dislocation. The therapeutic approach is still being debated. For conservative treatment can be using pain relievers such as physiotherapy, cognitive treatment, and giving intra-articular injections with sclerosis agents.²¹ Early conservative treatment by several manual reduction technique (Hippocrates, extra oral, the wrist pivot, recumbent technique) with sedatives or local anesthetic is the best approach for acute treatment and can gives optimal result. On the other hand, various treatment approach can be considered for management of chronic recurrent TMJ dislocation including various surgical

approach.^{12,14,22} Intravenous sedation and muscle relaxants are needed for reduction of mandibular dislocations due to muscle spasms within the temporomandibular joint. The treatment may intensify with supportive bandages and soft diet.^{23,24}

Treatment with manual reduction with local or general anesthesia. *Laskin* introduced an intraoral surgical approach to perform temporal muscle myotomy in 1973. This treatment limits the mandibular range of motion and allows only rotational movement of the condyle. The principle of the surgical procedures including eminectomy either remove the mechanical restriction in the condylar path or create a mechanical restriction by augmenting the articular eminence with bone grafts for treating hypermobility or TMJ recurrent dislocation.¹¹ In the extraoral method, the practitioner must apply force to the posteroinferior part of the coronoid process using the thumb. The advantage of this method is reduces the risk of being bitten by patient. The combined ipsilateral staggered technique involves reducing each TMJ separately. The practitioner uses one thumb intraorally to apply inferior pressure to the occlusive surface of the lower molar while simultaneously applying further posteroinferior pressure to the ipsilateral coronoid process extra orally. The maneuver is repeated on the contralateral side to complete the reduction.²¹ On radiological examination, lateral cephalometry is the choice for assessing the position of the condyles as well as pre-operative and post-operative assessment for temporomandibular disorders (TMD). Lateral cephalometric radiograph depicts the condylar head and glenoid fossa outline. The presence of superimposition with surrounding structures makes it difficult to assess the condyle.¹⁸

Case Report

In this series, we present eight cases of TMJ dislocations identified and treated in Central Sulawesi tertiary care center (Undata Hospital). Cases were identified during pandemic from March 2020 to March 2021. The dislocations occurred through a variety of mechanisms (trauma, wide opening after yawning, shouting) which presented in Table 1. All patients in this case series presented with the chief complaint of inability to closed their mouth. Two of our patients presented with systemic comorbidities

(hypertension and pulmonary diseases). There also a 52 years old male patient who was associated with traffic accident. The patient was unresponsive with intracerebral hemorrhage (GCS score was 9). The patient was clinically have locked jaw. The management of all the patients are reposition of the disc which performed in emergency unit, operating room, and the ICU for intubated patient (Table 1). There was one patient was taken to the operating room after manual reduction in emergency room did not work. The mandibular condyles were reduced back with intravenous sedation. All eight patients were successfully treated with manual reduction (recumbent technique/ supine position technique). Five patients managed with intravenous sedation and analgesic. The management of patient with TMJ dislocation need some modifications. In our hospital, patients presented in emergency unit was screened if the patients have atypical symptoms, as seen with COVID-19, after screening, patients which categorized with non-suspect case confirmed by rapid antigen test (All of our patients in this report confirmed with negative results for SARS-COV-2).

Discussion

TMJ dislocation is debilitating condition and decreasing the patient's quality of life because of the pain, discomfort, and prohibited the mouth movement, it usually needs urgent treatment. The pathogenesis of this condition is multifactorial. With careful physical and history assessment lead us to determine the predisposing factors in our patient. The etiology of initial dislocation is muscular miscoordination during jaw movement. The myospastic contraction prohibited self-reduction of mandibular condyle.^{22,25}

Various interventions have been proposed for TMJ dislocations, but the most effective method is still debated, which may result in treatment of this condition being based on experience.²⁶ The patient with acute TMJ dislocation should be treated with manual reduction. There are several techniques than can be used in this method, the Hippocrates technique is the most commonly used for management of TMJ dislocation. The extra oral, the wrist pivot, and recumbent technique/supine position are the alternative manual technique. Treatment of acute TMJ dislocation with manual

reduction can initially without administration of any medication, but if the attempt did not work, we should performed the reduction under medication such as analgesics, muscle relaxants, sedation, or general anesthesia.¹⁰ All of our TMJ dislocation patients underwent manual reduction with recumbent technique or supine position technique. This method provides adequate vision of intraoral and dynamic occlusion of the patients. We gave force application involves thumb pressure on the occlusal area of the lower posterior teeth and the anterior portion of the ascending ramus.

Jiantao Xu et al reported that the manipulation is biomechanically more flexible in the supine position technique than the other conventional method (Hippocrates technique). He also concluded that the TMJ dislocation reduction with this technique shortened operation time and reduced pain perception of the patient.²⁷

Huang et al reported that TMJ dislocations more than 30 days could not be treated by conventional manipulation even with muscle relaxation performed under general anesthesia, they recommended that persistent TMJ dislocation more than 4-12 weeks should treated by open reduction. There were several different techniques have been reported for treatment of chronic TMJ dislocations. Meniscectomy, condylectomy, coronoidectomy, vertical ramus osteotomy had been reported in the previous studies.¹¹

The SARS-CoV-2 found firstly in December 2019 in Wuhan, China, since that day, it spread massively in China and the other parts of the world, this pandemic caused unpredictable disruption to oral and maxillofacial surgeon in secondary and tertiary healthcare services. the pandemic had any impact on patients presenting TMJ dislocations and their management. In Addition, COVID-19 transmission occurs via aerosols, therefore assessment of aerosol generating procedures (AGPs) including manual reduction in patients with TMJ dislocations was a particular interest that need modification of treatment. The medical assessment is performed the day before surgery before admission screened the risk of Covid-19.^{28,29}

In our hospital, patients presented in emergency unit and screened if the patients have atypical symptoms, as seen with COVID-19, after screening, patients which categorized with non-suspect case confirmed by rapid antigen test (All

of our patients in this report confirmed with negative results for SARS-COV-2). Patients which categorized with high suspect continued the screening with nasopharyngeal swab RT-PCR test. The screening and test were performed before we made surgical intervention in our patients. The most important in our protocol in emergency settings during pandemic is wearing personal protective equipment (PPE) for the surgeon.

Conclusions

Temporomandibular disorders including temporomandibular dislocation are a class of chief complaint and clinical manifestations involving the temporomandibular joint, dislocation of the TMJ is a condition in which condylar processes does not reverse and displaced from its normal position in the glenoid fossa to the articular eminence. This condition can occur in the anterior, posterior, medial or lateral direction. The fundamental objective of treatment for TMJ dislocation to restore the normal position and function of TMJ, reduce pain, and increased patient's quality of life. The optimal treatment of acute TMJ dislocation is early reduction with different techniques to avoid the chronic condition and complication. All of our patients were successfully treated with manual reduction (supine position technique). The COVID-19 pandemic had any impact on patients presenting TMJ dislocations and their management, patients presented in emergency and ICU unit was screened and confirmed by rapid antigen test.

Declaration of Interest

The authors report no conflict of interest.

No	Case Demographics	Chief Complaint	Other medical condition	Diagnosis	Treatment
1.	Female/38 yo	Inability to closed her mouth after yawning 12 hours before hospital admission		Bilateral TMJ Dislocation	- Intravenous Diazepam and Ketorolac - Repositioning in emergency room
2.	Female/ 42 yo	Inability to closed her mouth after yawning and cough	Pulmonary diseases history	TMJ Dislocation	- Intravenous Diazepam and Ketorolac - Reposition in emergency room
3.	Female/46 yo	Inability to closed her mouth after yawning 2 hours before hospital admission	Hypertension (160/100)	Recurrent TMJ Dislocation	Intravenous Diazepam Reposition in emergency room
4.	Male/52 yo	Unresponsiveness patient after traffic accident	Intracerebral hemorrhage, GCS 9	TMJ Dislocation	Reposition in ICU with intubation Injection sedative agent
5.	Male/ 21 yo			Subluxation TMJ Dislocation	Reposition in emergency room
6.	Female/20 yo	Inability to closed her mouth 7 hours before hospital admission	-	Acute TMJ Dislocation	-Intravenous Diazepam and Ketorolac, ranitidine Reposition with total intravenous sedation after manual reposition in emergency room did not work
7.	Female/58 yo	Inability to closed her mouth after shouted, 6 hours before hospital admission			Reposition Without analgesic intravenously
8.	Female/40 yo	Inability to closed her mouth after yawning, 6 hours before hospital admission			Reposition without intravenous analgesics and sedation

Table 1. Summary of eight cases of TMJ dislocations identified and treated in Central Sulawesi tertiary care center. (Undata Hospital, Indonesia), including the chief complaint, diagnosis, and management of the patients.

References

- Murphy MK, MacBarb RF, Wong ME, Athanasiou KA. Temporomandibular Disorders: A Review of Etiology, Clinical Management, and Tissue Engineering Strategies. *Int J Oral Maxillofac Implants*. 2013;28(6):e393–414.
- Liu F, Steinkeler A. Epidemiology, diagnosis, and treatment of temporomandibular disorders. *Dent Clin North Am [Internet]*. 2013;57(3):465–79.
- Poluha RL, De La Torre Canales G, Costa YM, Grossmann E,

- Bonjardim LR, Conti PCR. Temporomandibular joint disc displacement with reduction: A review of mechanisms and clinical presentation. *J Appl Oral Sci*. 2019;27:1–9.
- Dimitroulis G. Management of temporomandibular joint disorders: A surgeon's perspective. *Aust Dent J*. 2018;63:S79–90.
- Antolis M, Noerhadi N.A.I, Purbianti M. Masseter Muscle Activity in Dolichofacial Patients with Temporomandibular Joint Disorders : An Electromyographic Study. *J Int Dent Med Res* 2021; 14 (1); 253 - 256
- Ahmed J, Jacob A.S, Sujir N, Shenoy N, Binnal A. Association of Headache with Myogenous and Arthrogeous type of

- Temporomandibular Joint Disorders. *J Int Dent Med Res* 2021;14(2): 742-745
7. Khabadze Z.S, Blokhina A.V, Mustafaeva R.S, Balashova M.E, Abdulkerimova, S.M, Bakaev Y, Kulikova A, Mordanov O.S. Temporomandibular Joint In Systemic Lupus Erythematosus : Literature Review. *J Int Dent Med Res* 2019; 12(2): 727-732
8. Yunisa F, Lydianna T, Rahmawati V, Biddinika M. K. Prevalence of Temporomandibular Joint Clicking In Adolescent , Adults, and Elderly Patients. *J Int Dent Med Res* 2020; 13(3): 1093 - 109
9. White T, Hedderick V, Ramponi DR. Dislocation of the Temporomandibular Joint and Relocation Procedures. *Adv Emerg Nurs J.* 2016;38(3):177–82.
10. Prechel U, Ottl P, Ahlers OM, Neff A. The treatment of temporomandibular joint dislocation - A systematic review. *Dtsch Arztebl Int.* 2018;115(5):59–64.
11. Gholami M, Shirzadeh A, Khalife H. Chronic Long-Standing Temporomandibular Joint Dislocation: Report of Three Cases and Review of Literature. *J Maxillofac Oral Surg [Internet].* 2018;17(4):502–7.
12. Pradhan L, Jaisani MR, Sagtani A, Win A. Conservative Management of Chronic TMJ Dislocation: An Old Technique Revived. *J Maxillofac Oral Surg.* 2015;14:267–70.
13. Baur DA, Jannuzzi JR, Mercan U, Quereshy FA. Treatment of long term anterior dislocation of the TMJ. *Int J Oral Maxillofac Surg [Internet].* 2013;42(8):1030–3.
14. Sarlabous M, Frdc A, Psutka DJ. Total Joint Replacement After Condylar Destruction Secondary to Long-Standing Dislocation of the Temporomandibular Joint. 2020;31(4):989–95.
15. Cohen A, Sela MC, Shooraki N, Alterman M, Casap N. The influence of articular eminence morphology on temporomandibular joint anterior dislocations. *Oral Surg Oral Med Oral Pathol Oral Radiol [Internet].* 2021;131(1):9–15.
16. Rakotomavo F, Raotoson H, Rasolonjatovo TY, Raveloson N. Temporomandibular joint dislocation during status epilepticus. *Oxford Med Case Reports.* 2017;2016(8):208–9.
17. Renapurkar SK, Laskin DM. Injectable Agents Versus Surgery for Recurrent Temporomandibular Joint Dislocation. *Oral Maxillofac Surg Clin North Am [Internet].* 2018;30(3):343–9.
18. Hanmongkhonsin N, Tohnaek S, Tantanapornkul W, Wirojchanasak S, Puapichartdumrong P, Piyapattamin T. Comparison of Image Negative and Brightness Enhancement for Temporomandibular Joint Visualization in Lateral Cephalometric Digital Radiography. *J Int Dent Med Res* 2021; 14(3): 1073 - 1078
19. Liu M, Liu AM, Lv K. Clinical Trial of Manual Reduction of Temporomandibular Joint Dislocation After Inhalation of Nitrous Oxide. 2019;30(8):2549–50.
20. Papoutsis G, Papoutsi S, Klukowska-Rötzler J, Schaller B, Exadaktylos AK. Temporomandibular joint dislocation: A retrospective study from a swiss urban emergency department. *Open Access Emerg Med.* 2018;10:171–6.
21. Agacayak K.S, Kose I, Gulsun B, Atalay Y, Yaman F, Ucan M.C. Temporomandibular Joint (TMJ) Dislocation During Intubation and Dental Procedures. *J Int Dent Med Res* 2012;5: (3), pp. 165-168
22. Abrahamsson H, Eriksson L, Abrahamsson P, Häggman-Henrikson B. Treatment of temporomandibular joint luxation: a systematic literature review. *Clin Oral Investig.* 2020;24(1):61–70.
23. Woodall CE, Padaki P, Siddiqui A, Bayoumi S. The use of intraoral local anaesthetic to aid reduction of acute temporomandibular joint dislocation. *J Stomatol Oral Maxillofac Surg [Internet].* 2019;120(2):152–3.
24. Tocaciu S, McCullough MJ, Dimitroulis G. Surgical management of recurrent TMJ dislocation—a systematic review. *Oral Maxillofac Surg.* 2019;23(1):35–45.
25. Ruiz S, Lim R. Spontaneous temporomandibular joint dislocation. *J Craniofac Surg.* 2019;30(3):E265–7.
26. al-Baghdadi M, Durham J, Araujo-Soares V, Robalino S, Errington L, Steele J. TMJ Disc Displacement without Reduction Management: A Systematic Review. *J Dent Res.* 2014;93:37S-51S.
27. Xu J, Dong S, Zhou H, Somar M, Lv K, Li Z. The supine position technique method is better than the conventional method for manual reduction of acute nontraumatic temporomandibular joint dislocation. *J Craniofac Surg.* 2016;27(4):919–22.
28. Philouze P, Cortet M, Quattrone D, Cérouse P, Aubrun F, Dubernard G, et al. Surgical activity during the Covid-19 pandemic: Results for 112 patients in a French tertiary care center, a quality improvement study. *Int J Surg [Internet].* 2020;80(May):194–201.
29. Putrino A, Raso M, Magazzino C, Galluccio G. Coronavirus (COVID-19) in Italy: Knowledge, management of patients and clinical experience of Italian dentists during the spread of contagion. *BMC Oral Health.* 2020;20(1):1–15.