DOI: https://doi.org/10.53350/pjmhs22166763

ORIGINAL ARTICLE

Treatment of Recurrent Dislocation of the Temporomandibular Joint with the Injection of Autologous Blood in Superior Joint Space with and without Pericapsular Tissue: An Experience at Tertiary Care Hospital of Peshawar

AIMEN MAHMOOD SHAH[1], ZAKIR ULLAH KHAN[2], SYEDA GULRUKH SABA SHAH[3], ZAHID SARFARAZ KHAN[4], FARKHANDA HINA[5], HURRAIA ZAHID[6], KALEEM UD DIN[7], IRFAN ULLAH[8]

[1]*Department of Oral Medicine, Oral Diagnosis & Radiology Department, Rehman college of Dentistry.*
[2]*Health Department KPK, Basic Health Unit Moroi (Lower Chitral) zackyrosey@gmail.com*
[3]*Department of Anatomy and Module Coordinator Department of Medical Education, Kabir Medical College, Gandhara University, Peshawar*
[4]*Department of Anatomy Khyber Girls Medical College, Peshawar, KPK zahidsurfarazmc@gmail.com*
[5]*Ruth Pfau College of Nutrition Sciences (A Project of LMDC)*
[6]*Senior Lecturer, Sardar Begum Dental College,*
[7]*Department of Oral Biology, Khyber Medical University, Peshawar*
[8]*Department of Life Sciences, School of Science, University of Management and Technology (UMT), Lahore, Pakistan*
Corresponding authors: Zahid Sarfaraz Khan, Kaleem Ud Din, Email: zahidsurfarazmc@gmail.com, drkaleem.kmu@gmail.com

ABSTRACT

Background: Recurrent TMJ (temporomandibular joint) dislocation is a condition characterized by frequent dislocation events. Recurrent TMJ dislocation may be treated using a variety of techniques, including conservative therapy and surgical treatments.

Objective: The objective of the study was to assess the effectiveness of treatment of recurrent dislocation of the temporomandibular joint with injection of autologous blood in superior joint space with and without pericapsular tissue

Methodology: The current study was prospective was carried out at the Kabir Medical College, Gandhara University, Peshawar for duration of one year from June 2021 to July 2022. The patients were categorized into group A and B, each having 50 patients. In group A patients the autologous blood was injected in superior joint space while in group B, autologous blood was injected in pericapsular tissue. The average reduction in mouth opening was recorded in both the groups. All the data analysis was performed by using IBM SPSS version 23.

Results: In group A patients, a mean (±sd) decrease in mouth opening of 3.30 (0.77) mm was observed (p=0.001) while a mean (±sd) decrease in mouth opening of 4.56 (0.72) mm was observed in group B patients (p=0.001). Dislocation recurrence was observed in 4 (57.14%) patients in group A while in group B, dislocation recurrence was observed in 3 (42.86%) patients (p=0.001).

Conclusion: Our study concludes that management of recurrent dislocation of TMJ with injection of autologous blood was safe, efficient, simple and economic procedure. Patients with recurrent TMJ dislocation should be encouraged to use autologous blood injection for their treatment.

Keywords: Recurrent; Temporomandibular joint dislocation; Autologous blood injection

INTRODUCTION

One of the most complicated face structures is the temporomandibular joint (TMJ), and diagnosing and treating its disorders presents special difficulties. The temporomandibular joint (TMJ) may dislocate as a result of routine actions like yawning and smiling, as well as through extensive opening of during dental procedures, tracheal intubation and vomiting attacks. Due to the in-coordination of the masticatory muscles, TMJ dislocation occurs more often un individuals with Parkinson's disease or cerebrovascular illnesses [1]. The mouth of an individual with TMJ dislocation cannot be closed; it is stuck open unless a mechanical reduction procedure is carried out. Recurrent TMJ dislocation is a condition characterized by frequent dislocation events. Therefore, individuals with this issue run the risk of TMJ dislocation just by going about their everyday business; the condition may be particularly serious when it is hard or impossible for the patient to self-reduce the TMJ dislocation.

Slackness in the TMJ ligaments, atypical eminence size or projection, a weak TMJ capsule, hyperactive or spasmodic muscles, trauma, and irregular chewing motions are some of the pathophysiologic factors that have been proposed for recurrent TMJ dislocation. Recurrent dislocation can damage the disc, the capsule, or the ligaments, which can lead to TMJ internal dislocation. The disorder is genetically predisposed in those with Marfan syndrome and Ehlers-Danlos syndrome [2]. Chronic, recurring TMJ dislocation is upsetting because it hurts and makes everyday tasks difficult. An individual's everyday activities might be seriously impacted by TMJ dislocation [2].

Dislocation can occur anteriorly, posteriorly, superiorly, medially, or laterally to the glenoid fossa, although anterior dislocation is the most frequent [3]. Approximately 3-7% of the overall population, particularly women, has anterior dislocation of the head of the condyle [4].

Clinical and radiological criteria are used for the diagnosis of TMJ dislocation [5]. A p ainful condition, extended face, inability to seal lips, slurred speech, and no obvious surgical scar or abrasions are among the symptoms [4]. Lack of sleep, fatigue/lethargy, impatience, fits of rage, depression, and auditory sensitivity are among potential effects of TMJ dislocation [6]. Due to the condylar head protruding into the empty fossa, a palpable bilateral pre-auricular depression is evident upon clinical examination.

Recurrent TMJ dislocation may be treated using a variety of techniques, including conservative therapy [7, 8] and surgical treatments [9, 10]. The problem is often unmanageable with conservative therapies such chin caps, elastic face bandages, or maxillomandibular fixation. While eminectomy surgery, which has an 85 percent or higher success rate, is regarded as the gold standard in the management of recurrent TMJ dislocation [11]. Although surgical intervention has a high likelihood of success, it is an intrusive process that needs general anaesthesia, stay in hospital, incision of skin, as well as a higher risk of facial nerve damage. In order to address recurrent TMJ dislocation, Schulz [12] first disclosed autologous blood injection in 1973. Takahashi et al. [13] in Japan were the first to document the effectiveness of autologous blood injection in a weakened individual who was not able to undergo surgery in 2003. About 80% of autologous blood injections are said to be successful overall [5, 14]. It is unclear exactly how autologous blood injected into the TMJ works [15]. The idea of autologous blood injection is to encourage the development of fibrosis inside the capsular tissue, which in turn will constrain the motion of mandibular excursion. For individuals who are contraindicated for surgical methods or who have recurrent TMJ

dislocation, autologous blood injection may be a potential substitute to surgery.

In comparison to other conventional method, treatment of chronic recurrent dislocation of TMJ can be easily managed with autologous blood injection. This study was carried out because only few studies are available in the literature reporting treatment of recurrent dislocation of the temporomandibular joint with injection of autologous blood.

MATERIALS AND METHODS

This prospective study was carried out at the Kabir Medical College, Gandhara University, Peshawar. The study duration was one year from June 2021 to July 2022. The study approval was properly taken from the hospital ethical and research committee. The sample size calculated was 100 patients by taking 80% test power, mean (±SD) decrease in opening of mouth of 3.6 (±1.5) mm in group A and mean (±SD) decrease in mouth opening of 5.3 (±1.2) in group B as shown in the previous study [5]. Sampling was done by using consecutive non-probability sampling method. The criteria for inclusion in our study were all the patients of both the sexes and age between 18 to 65 years presenting with recurrent TMJ dislocation to the hospital while all the patients not in the age range of our study and having acute dislocation, patients with first dislocation episode, patients with inflammatory problems of, patients with tumor, platelet function disorders and deficiency of fibrinogen were not included in our study. The study was explained to all the patients and then informed consent was taken. Demographic and clinical information's were recorded from all the participants. Cone beam computed tomography was used for radiographic information. The patients were categorized into two groups with each group having 50 patients. In group A patients the autologous blood was injected in superior joint space while in group B, autologous blood was injected in pericapsular tissue.

A blood of 3ml was taken in a sterile syringe in aseptic condition from the antecubital fossa of the patients. In group A patients, 2ml of autologous blood was injected bilaterally in superior joint space by using 18-gauge single needle method whereas in patients of group B, first aspiration was performed then injected 1ml of autologous blood in the pericapsular tissue by moving the needle 1cm outward under local anesthesia.

After the injection treatment was completed, patients were directed to wear an elastic headband for one day and to consume just soft foods for one week. For five days, 1gm tablet amoxicillin/clavulanate potassium were given twice daily. Diclofenac potassium 50 mg analgesic tablets were administered three times daily for three days. After the 1st week, it was recommended to do mandibular exercises four times each day. All of the patients had one follow-up visit after three months. In order to monitor and document clinical outcomes, such as a reduction in mouth opening, the patients were brought back for this follow-up. All the patients were instructed to open their mouths full, and the incisal margins of their upper and lower incisors were then measured vertically using a calliper. The average reduction in mouth opening was recorded. Results from radiological examinations were examined and compared between study groups.

All the data analysis was performed by using IBM SPSS version 23. Variables like pre-injection mouth opening, post-injection mouth opening and age were documented as means and standard deviations while other variables like gender were recorded in the form of frequencies and percentages. For effect modifiers, stratification of decrease in opening of mouth was done for gender, age and baseline opening of mouth by using post stratification t test. Independent sample t test was used for comparison of mean decrease in mouth opening between the group A and B by taking p value of ≤0.05 as significant.

RESULTS

In the current study, a total of 100 patients with recurrent TMJ dislocation were enrolled. Amongst patients of group A, males were 22 (44%) while females were 28 (56%) with mean (± sd) age of 31.12 (9.36) years. Amongst patients of group B, males were 21 (42%) while females were 29 (58%) with mean (± sd) age of 31.50 (11.21) years. (Figure 1)

On the basis of age wise distribution, amongst group A patients, 40 (80%) patients were age group 18-40 years while 10 (30%) patients were in age group 41-65 years. Amongst group B patients, 39 (78%) patients were in 18-40 years age group while 11 (22%) patients were in 41-65 years age group. (Figure 2)

Amongst group A patients, the pre-injection opening of mouth in range of 45-47mm was observed in 20 (40%) patients while it was observed in 30 (60%) patients in range of 48-50mm with mean (±sd) pre-injection opening of mouth of 47.62 (±1.32) mm. In group B patients, pre-injection opening of mouth was observed in 14 (28%) patients in range of 45-47mm while in range of 48-50mm it was observed in 36 (72%) patients with mean (±sd) pre-injection opening of mouth of 47.74 (±1.11) mm. (Table 1)

Amongst group A patients, the post-injection mouth opening in range of 41-43mm was observed in 14 (28%) patients while it was observed in 36 (72%) patients in range of 44-47mm with mean (±sd) pre-injection mouth opening of 44.32 (±1.29) mm. In group B patients, pre-injection opening of mouth was observed in 26 (52%) patients in range of 41-43mm while in range of 48-50mm it was observed in 24 (48%) patients with mean (±sd) pre-injection mouth opening of 43.18 (±1.27) mm. (Table 1)

In group A patients, 2-4mm decrease in mouth opening was observed in 10 (20%) patients while 5-7mm decrease in opening of mouth was observed in 40 (80%) patients with mean (±sd) decrease in mouth opening of 3.30 (0.77)mm (p=0.001). In group B patients, 2-4mm decrease in mouth opening was observed in 16 (32%) patients while 5-7mm decrease in opening of mouth was observed in 34 (68%) patients with mean (±sd) decrease in mouth opening of 4.56 (0.72)mm (p=0.001). (Table 1)

The overall frequency of Recurrence of dislocation was observed in7 (7%) patients. Amongst the 7 patients, dislocation recurrence was observed in 4 (57.14%) patients in group A while in group B, dislocation recurrence was observed in 3 (42.86%) patients (p=0.001). (Figure 3)

Stratification of decrease in opening of mouth with gender, age and baseline opening is given in table 2. (Table 2)

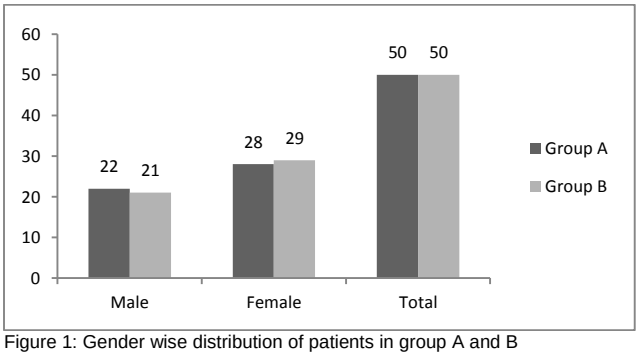

Figure 1: Gender wise distribution of patients in group A and B

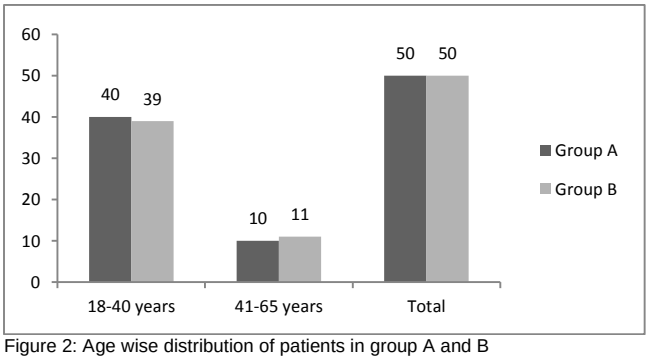

Figure 2: Age wise distribution of patients in group A and B

Table 1: Pre and post-injection of mouth opening and decrease in mouth opening of group A and B

Parameter	Sub-category	Group A n (%)	Group B n (%)
Pre-injection mouth opening	45 – 47mm	20 (40%)	14 (28%)
	48-50mm	30 (60%)	36 (72%)
	Mean (±sd)	47.62 (±1.32) mm	47.74 (±1.11) mm.
Post-injection mouth opening	41 – 43mm	14 (28%)	26 (52%)
	44-47mm	36 (72%)	24 (48%)
	Mean (±sd)	44.32 (±1.29) mm	43.18 (±1.27) mm
Decrease in mouth opening	2 – 4mm	10 (20%)	16 (32%)
	5-7mm	40 (80%)	34 (68%)
	Mean (±sd)	3.30 (0.77)mm	4.56 (0.72)mm
	P value	0.001	

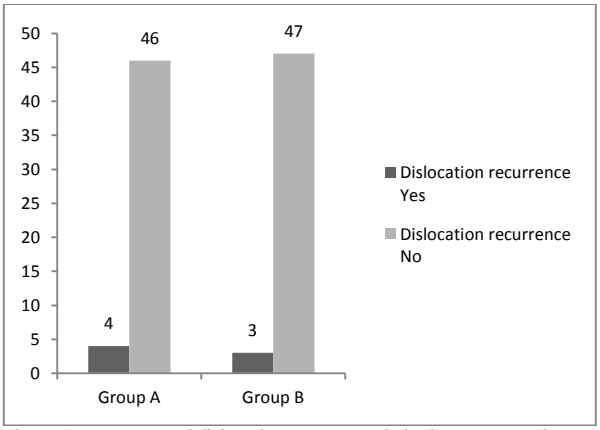

Figure 3: Frequency of dislocation recurrence in both group A and B

Table 2: Stratification of decrease in opening of mouth with gender, age and baseline opening

Parameter	Sub-category	Group A Mean (±sd)	Group B Mean (±sd)	P value
Gender	Male	3.40 (0.78)mm	4.66 (0.92)mm	0.001
	Female	3.20 (0.76)mm	4.49 (0.82)mm	0.001
Ages	18-40 years	3.32 (0.56)mm	4.61(0.77)mm	0.001
	41-65 yearss	3.65 (0.61)mm	4.71(0.71)mm	0.001
Baseline mouth opening	45 – 47mm	3.53 (0.81)mm	4.75 (0.45)mm	0.001
	48-50mm	3.36 (0.75)mm	4.51 (0.78)mm	0.001

DISCUSSION

The term "mouth opening" is often heard in professional settings. It serves as the common basis for many pathogenic manifestations. The goal of treating diseases influencing mouth opening is to return it to its natural state, just like with any other condition or disease [16].

It is common for people with chronic recurring TMJ dislocation to be unable to reduce their displaced joints on their own and need medical attention. Before choosing surgery, patients are often treated with non-surgical techniques first, like occlusal rehabilitation, regulated exercise, medicine and physiotherapy with ultra-shortwave. A sclerosing solution injection into the cavity of joint is one of the effective non-surgical therapy approaches that have been documented in the literature. But, a number of adverse effects including the potential for traumatic arthritis and facial paralysis have limited its use [2-4, 17].

Botox is another therapy with less adverse effects [18]. For a short time, the denervation caused by the poison weakens the chin-retracting muscles. The lateral pterygoid muscle is the best candidate for injection. Even with an extreme mouth opening, this method keeps the condyle from being displaced [8, 19].

The preferred therapy for chronic recurrent TMJ dislocation for the last 30 years has been autologous blood injection. Since the procedure is simpler and less fraught with complications, it is believed that autologous blood injection is highly favorable. Study reviewed the anatomical characteristics that predispose individuals to TMJ dislocation, documented several forms of dislocations, and came to the conclusion that more conservative treatments should be employed before invasive and difficult surgical procedures [20].

All of the individuals who received autologous blood injections in our research exhibited good tolerability and no complications. This is consistent with a prior investigation by Hasson and Nahlieli. Et al. on autologous blood injection for the treatment of patients with recurrent TMJ dislocation and reported no complication in all the patients enrolled in their study [15]. Another study also reported no complication after the autologous blood injection which is similar with our findings [21]. According to several studies, treatment of chronic TMJ dislocation with autologous blood injection of the TMJ is an easy, safe, and economical procedure [5, 22].

In the current study, an group A patients, 2-4mm decrease in mouth opening was observed in 20% patients while 5-7mm decrease in opening of mouth was observed in 80% patients with mean (±sd) decrease in mouth opening of 3.30 (0.77)mm (p=0.001). In group B patients, 2-4mm decrease in mouth opening was observed in 32% patients while 5-7mm decrease in opening of mouth was observed in 68% patients with mean (±sd) decrease in mouth opening of 4.56 (0.72)mm (p=0.001). These findings are in line with the previous study who reported almost same mean decrease in mouth opening [22]. In accordance with our study another research was carried out on 80 patients with recurrent TMJ dislocation. They categorized their patients into two groups similar to our study. Their reported mean decrease of mouth opening in group A was 3.51 (±0.86)mm while in group they reported mean decrease of 4.86 (±0.89)mm. These findings were almost similar to our findings [23].

Significant decrease in mouth opening was seen in the current research, with the difference perhaps attributable to patients who did not reduce mouth opening without physiotherapy not adhering to the suggested soft diet and lifestyle, including the nature of their occupation, their routine speaking, and their daily exercise routines, etc [24].

In our study, the overall frequency of Recurrence of dislocation was observed in 7% patients. Amongst the 7 patients, dislocation recurrence was observed in 57.14% patients in group A while in group B, dislocation recurrence was observed in 42.86% patients (p=0.001). These findings are almost similar with the previous study who reported similar recurrence of dislocation in recurrent TMJ dislocation [24]. Another study also reported comparable results [25].

According to our findings, autologous blood injection had limited advantages for individuals whose joints dislocated often, but it was beneficial for treating TMJs that dislocated less often and could be more helpful for treating TMJ subluxations. Other TMJ abnormalities history in individuals with chronic TMJ dislocation must also be taken into account by practitioners who choose to provide autologous blood injection. To evaluate autologous blood injection in individuals with highly frequent TMJ dislocation, more clinical and experimental research is required.

CONCLUSION

Our study concludes that management of recurrent dislocation of TMJ with injection of autologous blood was safe, efficient, simple and economic procedure. Patients with persistent recurrent TMJ dislocation should be motivated to use autologous blood injections for their treatment. Other studies based on large sample size and frequent dislocation of TMJ should be carried out.

REFERENCES

1. Nitzan DW. Temporomandibular joint "open lock" versus condylar dislocation: signs and symptoms, imaging, treatment, and pathogenesis. J Oral Maxillofac Surg. 2002;60(5):506-11.
2. Machon V, Abramowicz S, Paska J, Dolwick MF. Autologous blood injection for the treatment of chronic recurrent temporomandibular joint dislocation. J Oral Maxillofac Surg. 2009;67(1):114-9.
3. Shakya S, Ongole R, Sumanth K, Denny C. Chronic bilateral dislocation of temporomandibular joint. Kathmandu University Medical Journal. 2010;8(2):251-6.
4. Gutierrez LMO, Grossmann TK, Grossmann E. Anterior dislocation of head of mandible: diagnosis and treatment. Revista Dor. 2011;12:64-70.
5. Daif ET. Autologous blood injection as a new treatment modality for chronic recurrent temporomandibular joint dislocation. Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology. 2010;109(1):31-6.
6. ANJUM S, FAISAL M, Nadeem M, WARRAICH RA. OUTCOMES OF AUTOGENOUS BLOOD INJECTION IN THE TREATMENT OF RECURRENT DISLOCATION OF TEMPOROMANDIBULAR JOINT (TMJ). Pakistan Oral & Dental Journal. 2013;33(1).
7. Matsushita K, Abe T, Fujiwara T. OK-432 (Picibanil) sclerotherapy for recurrent dislocation of the temporomandibular joint in elderly edentulous patients. Br J Oral Maxillofac Surg. 2007;45(6):511-3.
8. Fu K-Y, Chen H-M, Sun Z-P, Zhang Z-K, Ma X-C. Long-term efficacy of botulinum toxin type A for the treatment of habitual dislocation of the temporomandibular joint. Br J Oral Maxillofac Surg. 2010;48(4):281-4.
9. Srivastava D, Rajadnya M, Chaudhary MK, Srivastava J. The Dautrey procedure in recurrent dislocation: a review of 12 cases. Int J Oral Maxillofac Surg. 1994;23(4):229-31.
10. Kuttenberger J, Hardt N. Long-term results following miniplate eminoplasty for the treatment of recurrent dislocation and habitual luxation of the temporomandibular joint. Int J Oral Maxillofac Surg. 2003;32(5):474-9.
11. Coser R, da Silveira H, Medeiros P, Ritto F. Autologous blood injection for the treatment of recurrent mandibular dislocation. Int J Oral Maxillofac Surg. 2015;44(8):1034-7.
12. Schulz S. Evaluation of periarticular autotransfusion for therapy of recurrent dislocations of the temporomandibular joint. Dtsch Stomatol. 1973;23(2):94-8.
13. TAKAHASHI K, TANAKA C, YAMAKI M. A case of recurrent temporomandibular joint dislocation successfully treated by autologous blood injection. Japanese Journal of Oral and Maxillofacial Surgery. 2003;49(6):409-11.
14. Bayoumi A, Al-Sebaei M, Mohamed K, Al-Yamani A, Makrami A. Arthrocentesis followed by intra-articular autologous blood injection for the treatment of recurrent temporomandibular joint dislocation. Int J Oral Maxillofac Surg. 2014;43(10):1224-8.
15. Hasson O, Nahlieli O. Autologous blood injection for treatment of recurrent temporomandibular joint dislocation. Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology. 2001;92(4):390-3.
16. Khare N, Patil SB, Kale SM, Sumeet J, Sonali I, Sumeet B. Normal mouth opening in an adult Indian population. J Maxillofac Oral Surg. 2012;11(3):309-13.
17. Kato T, Shimoyama T, Nasu D, Kaneko T, Horie N, Kudo I. Autologous blood injection into the articular cavity for the treatment of recurrent temporomandibular joint dislocation: a case report. J Oral Sci. 2007;49(3):237-9.
18. Ziegler CM, Haag C, Mühling J. Treatment of recurrent temporomandibular joint dislocation with intramuscular botulinum toxin injection. Clin Oral Investig. 2003;7(1):52-5.
19. Bouso OV, González GF, Mommsen J, Grau VG, Fernández JR, Micas MM. Neurogenic temporomandibular joint dislocation treated with botulinum toxin: report of 4 cases. Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology. 2010;109(3):e33-e7.
20. Akinbami BO. Evaluation of the mechanism and principles of management of temporomandibular joint dislocation. Systematic review of literature and a proposed new classification of temporomandibular joint dislocation. Head Face Med. 2011;7(1):1-9.
21. Varedi P, Bohluli B. Autologous blood injection for treatment of chronic recurrent TMJ dislocation: is it successful? Is it safe enough? A systematic review. Oral Maxillofac Surg. 2015;19(3):243-52.
22. Triantafillidou K, Venetis G, Markos A. Short-term results of autologous blood injection for treatment of habitual TMJ luxation. J Craniofac Surg. 2012;23(3):689-92.
23. Bukhari AH, ur Rahim A. Comparison of mean decrease in mouth opening by autologous blood injection in superior joint space with and without pericapsular tissue in treatment of chronic recurrent temporomandibular joint dislocation in Mayo hospital Lahore. JPMA. 2020;70(1878).
24. Stembirek J, Matalová E, Buchtová M, Machon V, Misek I. Investigation of an autologous blood treatment strategy for temporomandibular joint hypermobility in a pig model. Int J Oral Maxillofac Surg. 2013;42(3):369-75.
25. Amer I, Kukereja P, Gaber A. Efficacy of Autologous Blood Injection for Treatment of Chronic Recurrent Temporo-mandibular Joint Dislocation. Egyptian Journal of Ear, Nose, Throat and Allied Sciences. 2021;22(22):1-6.