



THE EFFECTS OF MANUAL THERAPY AND HOME EXERCISE IN A CANCER PATIENT WITH COMPLICATIONS AFTER THIRD MOLAR EXTRACTION: CASE REPORT

Hasan Erkan KILINÇ^{1*}

ABSTRACT

Purpose: Pain, oedema, and, more rarely, infection and trismus may occur after third molar extraction. The risk of these complications increases in patients with immunosuppressive conditions such as cancer, diabetes, and HIV (Human Immunodeficiency Virus). The aim of this case study was to report a patient with metastatic breast cancer who developed infection, persistent oedema and trismus following extraction of the third molar and the effect of manual therapy.

Methods: A 60-year-old patient with a history of type II diabetes with metastatic breast cancer developed left mandibular and deep neck infection, oedema, and trismus after surgical extraction of 3 molars in the 2nd week after the diagnosis of cancer. The patient presented with pain, hard oedema, and trismus on the 85th postoperative day, although the infection had disappeared and the oedema level had decreased. The patient underwent a 6-week manual therapy and home exercise programme to increase the limited mouth opening distance.

Results: After this treatment, significant improvements were noted in the level of pain, oedema, trismus, disability due to craniofacial pain, and mandibular dysfunction.

Discussion: In specific patient groups, manual therapy-based physiotherapy can be considered an effective approach for complications such as persistent oedema and trismus in the temporomandibular region after molar surgery.

Key Words: Trismus, Physiotherapy, Manual Therapy, Pain.

ÖZET

Amaç: Üçüncü molar diş çekiminden sonra ağrı, ödem ve daha nadir olarak enfeksiyon ve trismus görülebilir. Bu komplikasyonların riski kanser, diyabet ve HIV (Human Immunodeficiency Virus) gibi immünosupresif durumları olan hastalarda artmaktadır. Bu vaka çalışmasının amacı, üçüncü molar diş çekimi sonrasında enfeksiyon, kalıcı ödem ve trismus gelişen metastatik meme kanserli bir hastayı ve manuel tedavinin etkisini rapor etmektir.

Yöntem: Metastatik meme kanseri olan ve tip II diyabet öyküsü bulunan 60 yaşındaki hastada, kanser tanısı konulduktan sonraki 2. haftada 3 molar dişin cerrahi olarak çekilmesinden sonra sol mandibular ve derin boyun enfeksiyonu, ödem ve trismus gelişmiştir. Hasta, enfeksiyonun kaybolmasına ve ödem seviyesinin azalmasına rağmen ameliyat sonrası 85. günde ağrı, sert ödem ve trismus ile başvurdu. Hastaya, sınırlı ağız açma mesafesini artırmak için 6 haftalık manuel terapi ve ev egzersiz programı uygulandı.

Bulgular: Bu tedaviden sonra ağrı, ödem, trismus, kraniyofasiyal ağrıya bağlı sakatlık ve mandibular disfonksiyon düzeyinde önemli iyileşmeler kaydedilmiştir.

Tartışma: Belirli hasta gruplarında, molar cerrahi sonrası temporomandibular bölgede kalıcı ödem ve trismus gibi komplikasyonlar için manuel terapi temelli fizyoterapi etkili bir yaklaşım olarak düşünülebilir.

Anahtar Kelimeler: Trismus, Fizyoterapi, Manuel terapi, Ağrı.

¹Hacettepe University, Faculty of Physical Therapy and Rehabilitation, Spine Health Unit, Ankara, Turkey.

*Corresponding author e-mail: erkankilinc86@hotmail.com

INTRODUCTION

Following third molar extraction, pain, and oedema are known to be among the most common symptoms. It has been stated that vascular dilatation and increased permeability following the intervention cause postoperative oedema, which gradually reaches a maximum level in the first 48 hours, starts to regress on the 4th day, and disappears on average on the 7th day (1). It has also been reported that trismus may develop following third molar tooth extraction and gradually disappear within approximately one to two weeks postoperatively. However, in very rare cases, trismus may persist for more than one month (2). The incidence of infection following third molar extraction has been reported to be between 3% and 5% (3, 4). It has been emphasized that this risk increases in disease states that may cause immunodeficiency such as cancer, diabetes, and HIV (5). This case report presents a patient with metastatic breast cancer who developed an infection, persistent oedema, and trismus after the extraction of a third molar tooth, and the results of the physiotherapy and rehabilitation program with a focus on manual therapy.

METHODS

Case Description

Selective estrogen receptor modulator (SERMs) group drug treatment was initiated in a 60-year-old married woman with a history of type II diabetes mellitus who was diagnosed with breast cancer that metastasized to the vertebral corpus and costae. The patient was admitted to the maxillofacial

surgery clinic due to severe toothache in the 2nd week after diagnosis, and the left 3rd molar tooth was extracted surgically. After the surgery, the patient gradually developed oedema and infection. Oral antibiotic treatment was started and continued for one month. Pain and oedema continued to progress, and trismus developed in the 4th week postoperatively.

On the CT (Computed Tomography) scan taken in postoperative week four an abscess was observed covering an area of approximately 52x30 mm around the corpus and ramus of the left mandible (Figure 1).

Subsequently, oedema increased in severity, and a deep neck infection developed. After a further two weeks, surgical intervention and intraoral drainage from the left cervical region were performed to drain the infection and oedema, but without success.

On the second CT scan taken one week after the drainage intervention, it was noted that the inflammatory changes in the left masticator space extended from the mandibular ramus to the infratemporal fossa, parapharyngeal area, temporal fossa, and deep buccal fat pad, continued up to level 2 in front of the SCM (Sternocleidomastoid) muscle, and reached 1.1 cm in the temporal fossa and deep buccal fat pad, where the abscess thickness was most prominent. After completion of oral antibiotic treatment, the infection disappeared and the oedema volume decreased, but the pitting oedema involving the left mandibular corpus and ramus and extending to the buccal region persisted.

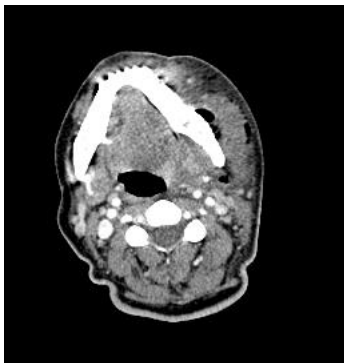


Figure 1: CT image of the patient showing oedematous change



Figure 2: Reference lines for oedema measurement

Outcome Measure

On the 85th day after tooth extraction, the patient presented at our clinic with severe pain and trismus in the left mandibular region, which had been ongoing for two months. Solid food intake was very limited, and most of the nutrition was obtained from liquid and pudding-like foods. Initial examination revealed a hard pitting oedema extending from the corpus and ramus of the left mandible to the buccal region, causing pain on palpation

Pain at rest, during mandibular activity and during sleep was assessed using a visual analog scale (VAS), and maximum mouth opening distance was assessed by measuring the distance from the anterior edge of the upper incisors to the anterior edge of the lower incisors with a dental caliper (ProDent USA) (6). To assess facial oedema, the distances between the tragus-lateral corner of the mouth, the tragus-mandibular anterior tip, and the tragus-lateral corner of the eye were measured with a universal tape measure without applying pressure to the soft tissues, and the values were totalled and recorded (Figure 2). This measurement was made on both sides of the face, and the difference between the two sides was accepted as the oedema value (7, 8). In

addition, levels of facial and cranial pain and disability were assessed using the Craniofacial Pain and Disability Index (CFPDI) Turkish version, and levels of mandibular function were assessed using the Mandibular Functional Impairment Questionnaire (MFIQ) Turkish version. The 21-item CFPDI was used to determine the severity of pain and disability in the face, jaw, head, and neck region. The questionnaire consists of three sub-parameters: Pain and Psychosocial Disability (6 items), Jaw Functional Status (6 items), and Frequency of Comorbidities and Disability (8 items). The total score ranges from 0 to 63 points, with higher scores indicating greater severity of pain and disability (9, 10). The MFIQ consists of 17 items and 2 subgroups (Subgroup 1: functional capacity, Subgroup 2: nutrition). The questionnaire assesses the difficulty of performing various mandibular tasks on a 5-point Likert scale (0 = no difficulty; 4 = very difficult or impossible without assistance). Higher scores indicate more mandibular dysfunction. The total score ranges from 0 to 68 points. The Turkish version of this questionnaire has been used (11, 12). All the assessments were repeated after 6 weeks of treatment (Table 1).

Table 1. Outcomes of Pre- and Post-treatment Evaluation

Measurements	Before Treatment	After Treatment
Pain at rest VAS (mm)	60.00	20.00
Pain during mandibular activity VAS (mm)	70.00	30.00
Pain during sleep VAS (mm)	60.00	20.00
Maximum mouth opening range (mm)	9.00	32.00
Length of line A (cm)	12.20	11.60
Length of line B (cm)	11.20	10.90
Length of line C (cm)	16.60	15.50
Differences between the total line lengths of both sides of the face (cm)	3.30	1.30
CFPDI Total Score (points) (Max: 63)	48.00	18.00
Pain and Psychosocial Limitation (points) (Max: 18)	13.00	6.000
Jaw Functional Status (points) (Max: 27)	20.00	7.00
Frequency and Comorbidity (points) (Max: 18)	15.00	5.00
MFIQ Total Score (points) (Max: 68)	50.00	13.00
Functional Capacity (points) (Max: 44)	30.00	8.00
Feeding (points) (Max: 24)	20.00	5.00

mm: millimetres, cm: centimetres, Length of line A: Distance between the lateral eye margin and the corner of the ramus mandibula, B: Distance between tragus and lateral corner of the mouth, length of line, C: Distance between tragus and mandibular anterior tip, CFPDI: Craniofacial pain and disability index, MFIQ: Mandibular functional impairment questionnaire, Max: maximum points that can be obtained



Figure 3: Facial view and mouth opening distance of the patient before and after treatment

Treatment Approach

The patient was enrolled in a physiotherapy and rehabilitation program for a total of 12 sessions of 45 minutes each, twice a week for a period of 6 weeks, to eliminate the oedema in the left mandibular region and increase the active mouth opening range. The main hypothesis of this treatment protocol was to focus on trismus secondary to oedema rather than eliminating oedema, because the edema was hard and painful on palpation. It was thought that by increasing the mandibular functionality of the patient, the edema could be eliminated with the pumping effect of masticatory muscle contraction in wider ranges of motion. Therefore, the treatment protocol was planned based on this hypothesis.

The treatment program started with bilateral manual cervical fascia release for 3 repetitions of 20 seconds each. Then, taking into account the end-feel, a low-intensity rhythmic synchronized sliding with the therapist's thumb upwards from the patient's maxillary incisors and with the index finger downwards from the incisors in the mandibular region was applied. This application was performed for 5 repetitions of 10 seconds. The ischaemic compression technique was applied with the therapist's index finger to the painful spasmodic points through the skin surface for the left masseter muscle and intraorally for the left medial pterygoid muscle. Ischemic compression was applied to all painful spasmodic points 2 repetitions for 20 seconds each spasmodic points. After ischaemic compression, the left masseter and medial pterygoid muscles were manually stretched painlessly for 30 seconds. In the final part of the treatment, the patient's TMJ (Temporomandibular Joint) was rhythmically mobilized in the anterior and inferior directions for 20 seconds each for

3 repetitions with 30-second rest intervals, and manual traction was applied in the same direction for 30 seconds. A home exercise program was given, comprising stretching exercises in the direction of opening the mouth for a total of 15 minutes 3 times a day and strengthening exercises with pack elastics attached to the posterior part of the molars in the ranges of motion gained in 10x3 repetitions. It was recommended to use an exercise diary to monitor adherence to home exercise. The patient showed a compliance rate of 75% with the home exercise program. Care was taken to perform both the manual techniques applied in the clinic and the exercises given as a home program within the pain limit. Before and after treatment, the patient's facial oedema status and painless mouth opening width are shown in Figure 3. The necessary permission was obtained from the patient to use the medical information and pictures in the case report.

RESULTS

All measurement results are presented in table 1.

DISCUSSION

Following a 6-week physiotherapy and rehabilitation programme in a type II diabetic patient with breast cancer, significant improvements were seen in the levels of pain at rest, during mandibular activity and sleep, the level of oedema in the left mandibular region, maximum mouth opening distance, craniofacial pain and disability, and mandibular dysfunction.

It has been reported that the risk of complications such as infection, gingival bleeding, trismus, oedema, and severe pain after 3rd molar tooth extraction is up to 40% in people with immunocompromised diseases such as cancer (13). There are

even studies advocating that impacted or partially erupted third molars should be extracted in all cancer cases, especially in head and neck cancer patients, even if they are asymptomatic, due to the potential to cause dental pathologies secondary to treatment, the high risk of complications, and the possibility that complication-oriented treatments may interfere with cancer treatments. (14, 15). Tai et al (16) extracted the third molars of 15 of 25 cancer patients and reported that the above-mentioned complications occurred in 6 (40%) patients. An interesting point in that case series is that, similar to the current case, the third molar became symptomatic after cancer in 16 of the 25 cases.

Although it had been about 3 months since the extraction of the 3rd molar, the patient experienced pain that could be considered severe. It has been reported that pain is the most common symptom after third molar extraction, usually peaking in the first 6–12 hours and disappearing on the 3–5th postoperative day (5, 17). In the current patient, the high level of pain during rest and sleep was especially remarkable. Pain during rest and sleep is usually suggestive of infection, inflammation, or tumoral conditions. An infection developed after the third molar surgery, but that disappeared before the physiotherapy programme was started, and there was no metastasis in the craniofacial structures. Although these conditions were ruled out, it is possible that the persistent pitting oedema in the left mandibular region compressed the trigeminal nerve and caused neuralgia. In parallel with this idea, there are previous studies suggesting that facial oedema may cause trigeminal neuralgia (18, 19). The substantial resolution of the oedema after treatment may have led to a significant reduction in pain.

As the edema was persistent and stiff, pain occurred with palpation, and drainage techniques were unsuccessful, a physiotherapy approach was not applied primarily for the removal of oedema in the left mandibular region of the patient. Zhang et al. (2) reported that trismus developed after extraction of the third molar tooth and recovered on the 45th postoperative day. The cause of trismus development was explained as the prolonged contact of inflammatory mediators in the content of oedema, which persisted for a long

time with the infection that occurred in the patient, to the medial pterygoid muscle, causing spasm. The authors emphasised the importance of early and effective drainage of oedema that lasts longer than normal in these patients. Although the characteristics of that case are very similar to those of the current patient, it was emphasised that internal drainage played a key role in the treatment of trismus in that case. However, in the current case, drainage intervention was not effective and manual physiotherapy methods produced the main therapeutic effect, as the patient did not receive any other treatment for oedema and trismus during the physiotherapy and rehabilitation process. In this case, the decrease in oedema parallel to the improvement in trismus may have been due to the pumping effect of the masticator muscles with their contraction in wider ranges of motion. There is a wide spectrum of studies suggesting that increased muscle contractions increase the return of oedema to the venous and lymphatic systems by creating a pumping effect (20-22).

Significant improvements were recorded in the CFPDI subscale and total scores. Trismus has the potential to cause significant deteriorations in critical functions such as speaking and eating. Considering the high score in the pain and psychosocial limitation subscale before physiotherapy and rehabilitation, this seems to have increased the impairment in socialisation and, secondarily, the possible negative psychological effects of the pre-existing disease. The remarkable change in this score after the treatment programme can be considered to be valuable from a biopsychosocial point of view. The substantial improvement in the jaw functional status score of the CFPDI seems to be the main determining factor in this regard.

It would not be too ambitious to attribute the considerable improvements in both functional capacity and feeding subscale scores of the MFIQ within a 6-week period to the significant decrease in trismus. In particular, the score close to the maximum score obtained in the feeding sub-parameter before treatment shows that trismus has devastating effects on basic vital functions of the patient. The high rate of improvement in this sub-parameter suggests that

the effectiveness of the physiotherapy approach, including manual applications, is valuable in this regard.

CONCLUSION

A physiotherapy approach involving manual techniques was found to be largely effective on the level of pain, oedema, trismus, and related disability in a cancer patient who developed refractory complications after third molar extraction. However, case series and controlled studies are needed to make a general conclusion that this approach is effective in such specific cases.

Acknowledgment: None.

Author Contributions: HEK: Concept, design, data collection and or processing, literature search, writing manuscript.

Financial Support: This research received no specific grant from public, commercial, or not-for-profit funding agencies.

Conflict of Interest: The authors declare no conflicts of interest.

How to cite this article: Kılınç HE. The Effects of Manual Therapy and Home Exercise in a Cancer Patient with Complications After Third Molar Extraction: Case Report. *Journal of Hacettepe University Physical Therapy and Rehabilitation*. 2024;3(2), 31-36.

REFERENCES

- Peterson LJ. Contemporary oral and maxillofacial surgery. (No Title). 2003.
- Zhang Y, Zhuang P, Jia B, Xu J, Cui Q, Nie L, et al. Persistent trismus following mandibular third molar extraction and its management: A case report and literature review. *World Academy of Sciences Journal*. 2021;3(1):1-.
- Osborn TP, Frederickson G, Jr., Small IA, Torgerson TS. A prospective study of complications related to mandibular third molar surgery. *J Oral Maxillofac Surg*. 1985;43(10):767-9.
- Goldberg MH, Nemarich AN, Marco WP, 2nd. Complications after mandibular third molar surgery: a statistical analysis of 500 consecutive procedures in private practice. *J Am Dent Assoc*. 1985;111(2):277-9.
- De Menezes SA, Cury PR. Efficacy of nimesulide versus meloxicam in the control of pain, swelling and trismus following extraction of impacted lower third molar. *Int J Oral Maxillofac Surg*. 2010;39(6):580-4.
- Dijkstra PU, de Bont LG, Stegenga B, Boering G. Angle of mouth opening measurement: reliability of a technique for temporomandibular joint mobility assessment. *J Oral Rehabil*. 1995;22(4):263-8.
- Schultze-Mosgau S, Schmelzeisen R, Frolich JC, Schmele H. Use of ibuprofen and methylprednisolone for the prevention of pain and swelling after removal of impacted third molars. *J Oral Maxillofac Surg*. 1995;53(1):2-7; discussion -8.
- Gabka J, Matsumura T. [Measuring techniques and clinical testing of an anti-inflammatory agent (tantum)]. *Munch Med Wochenschr*. 1971;113(6):198-203.
- Arikan H, Citaker S, Ucok C. Cross-cultural adaptation, reliability, and validity of the Turkish version of the Craniofacial Pain and Disability Inventory (CF-PDI/T) for individuals with temporomandibular disorders. *Disabil Rehabil*. 2023;45(3):523-33.
- Kılınç HE, Çelik Hİ, Ünver B, Hocaoglu TP. Further Validity and Reliability of Turkish Version of the Mandibular Functional Impairment Questionnaire in Patients with Temporomandibular Dysfunction. *Journal of Basic and Clinical Health Sciences*. 2022;7(1):214-22.
- Stegenga B, de Bont LG, de Leeuw R, Boering G. Assessment of mandibular function impairment associated with temporomandibular joint osteoarthritis and internal derangement. *J Orofac Pain*. 1993;7(2):183-95.
- Yildiz NT, Alkan A, Kulunkoglu BA. Validity and Reliability of the Turkish Version of Mandibular Function Impairment Questionnaire. *Cranio*. 2024;42(2):160-70.
- Hong CH, Napenas JJ, Hodgson BD, Stokman MA, Mathers-Stauffer V, Elting LS, et al. A systematic review of dental disease in patients undergoing cancer therapy. *Support Care Cancer*. 2010;18(8):1007-21.
- Peterson LJ. Rationale for removing impacted teeth: when to extract or not to extract. *J Am Dent Assoc*. 1992;123(7):198-204.
- Hinds EC, Frey KF. Hazards of retained third molars in older persons: report of 15 cases. *J Am Dent Assoc*. 1980;101(2):246-50.
- Tai CC, Precious DS, Wood RE. Prophylactic extraction of third molars in cancer patients. *Oral Surg Oral Med Oral Pathol*. 1994;78(2):151-5.
- Fisher SE, Frame JW, Rout PG, McEntegart DJ. Factors affecting the onset and severity of pain following the surgical removal of unilateral impacted mandibular third molar teeth. *Br Dent J*. 1988;164(11):351-4.
- Nurmikko TJ, Eldridge PR. Trigeminal neuralgia--pathophysiology, diagnosis and current treatment. *Br J Anaesth*. 2001;87(1):117-32.
- Benoliel R, Zadik Y, Eliav E, Sharav Y. Peripheral painful traumatic trigeminal neuropathy: clinical features in 91 cases and proposal of novel diagnostic criteria. *J Orofac Pain*. 2012;26(1):49-58.
- Tsuda K, Takahira N, Sakamoto M, Shinkai A, Kaji K, Kitagawa J. Intense Triceps Surae Contraction Increases Lower Extremity Venous Blood Flow. *Prog Rehabil Med*. 2017;2:20170009.
- Gianesini S, Tessari M, Bacciglieri P, Malagoni AM, Menegatti E, Occhionorelli S, et al. A specifically designed aquatic exercise protocol to reduce chronic lower limb edema. *Phlebology*. 2017;32(9):594-600.
- Mortimer P. Therapy approaches for lymphedema. *Angiology*. 1997;48(1):87-91.