GSC Advanced Research and Reviews

eISSN: 2582-4597 CODEN (USA): GARRC2

Cross Ref DOI: 10.30574/gscarr

Journal homepage: https://gsconlinepress.com/journals/gscarr/

(REVIEW ARTICLE)

Check for updates

TMJ and Pregnancy

Safa Jambi [1] and Mohammad Othman [2, *]

[1] *College of Dentistry, Taibah University, Madinah, Saudi Arabia.*
[2] *Clinical Department, Fakeeh College for Medical Sciences, Jeddah, Saudi Arabia.*

GSC Advanced Research and Reviews, 2022, 11(03), 020–023

Publication history: Received on 17 April 2022; revised on 03 June 2022; accepted on 05 June 2022

Article DOI: https://doi.org/10.30574/gscarr.2022.11.3.0131

Abstract

Dramatic physiological changes of women body due to pregnancy may elicit temporomandibular joint disorders (TMD). Furthermore, decrease immunity and stresses of pregnancy contribute to provoke TMD. To limit and prevent TMD, small lifestyle changes can be employed during pregnancy to insure warding off joint affection. Similarly, treatment options are available and one of the basic and apparent options is the use of bite plates. Because of the prevalence and importance of TMD in pregnant women, this literature review suggests adding education on TMD and its prevention to any antenatal program. There is a real demand for more studies on incidence of TMD during pregnancy and prognosis after that.

Keywords: Temporomandibular Joint (TMJ); Temporomandibular Disorders (TMD); Bruxism; Relaxin; Oestrogen; Pregnancy

1. Introduction

The connection of jawbone to each side of the skull is achieved by a sliding hinge joint known as temporomandibular joint (TMJ) (Figure 1) [1, 2]. Disorders that cause pain in the joint and in the muscles controlling jaw movements are called TMJ disorders (TMD) [3].

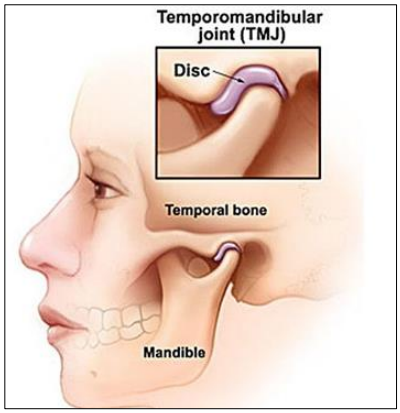

Figure 1 TMJ

* Corresponding author: Mohammad Othman
Clinical Department, Fakeeh College for Medical Sciences, Jeddah, Saudi Arabia.

After exclusion of dental pain, TMD is the primary cause of facial pain. TMD can be defined as mess coordinated joint function due to imperfect occlusion of teeth [3, 4]. TMD symptoms are outspread and include some of the ear symptoms. These include, limitation of jaw range of motion, painful jaw range of motion, TMJ clicking and locking, Headaches, soreness, jaw and neck tensions [5, 6]. On top of that, symptoms may include unsteadiness and buzzing sounds [2, 6]. TMD affects females more than males almost 2:1. The peak age for affection is between 20 - 40 years old and has a low incidence in children and old adults [1, 2, 5, 6]. TMD has higher partnership with menstruation, where it is more frequent with premenstrual period and less common postmenstrual [7, 8]. These proceedings suggest that female hormones may emulate TMD. Furthermore, pregnancy brings about impressive hormonal increase principally in oestrogen and progesterone [4, 5].

Numerous oestrogen receptors found in TMJ, with high affinity of oestrogen receptors in the articular cartilage of the joint [7, 9]. Oestrogen known to act directly on monocytes and macrophages to regulate the production of cytokines (IL-1 and IL-6). Added to that oestrogen regulate the production of tumor necrosis factor (TNF). Cytokines IL-1 and IL-6 found to be inflammatory mediators in the TMJ synovium. IL-1 and TNF had two actions here which promote inflammation leading to TMD symptoms [2, 7, 9]. These actions are promoting cartilage reabsorption and inhibiting synthesis of proteoglycans [9]. In animal studies, researchers noticed that oestrogen reduces activity and gene expression of proteoglycan which is important for lubrication of TMJ. More, oestrogen increase protease activity which decrease health of articulate disc of TMJ [2, 5, 7, 9]. On top of that, oestrogen decrease the articular fibrocartilage thickness and increasing collagen causing hypertrophic chondrocyte zone. This in turn affects TMJ movement initiating TMD [1, 2, 7, 9].

The other pregnancy hormone starting from the beginning of second trimester until delivery of the baby is Relaxin. This is the hormone responsible to increase the mobility of pregnant woman's joints to help in the preparation and ease delivery of the baby. Relaxation and hypermobility of joints may grant the development of TMD [1, 2]. Moreover, relaxin increases the expression of specific tissue degrading enzymes and predispose to aberrant joint remodeling [1, 4]. Overall, oestrogen and relaxin, each on their own and together, reduced overall disc and joint collagen content therefore, spark TMD [5, 8].

During pregnancy, there is no position that is comfortable to sleep. Added to that, with progress of pregnancy their will be frequent urinations due to increasing size of uterus[8, 10, 11]. This urination in turn affects sleeping too. Sleeping disturbance is associated with increased stress and anxiety levels and sequentially increase the probability of tooth grinding and clenching. This is known as bruxism. Chronic bruxism induces TMD [12-15]. Furthermore, with increasing the size of pregnant women abdomen, they find it sometimes convenient and manageable to sleep on one side all the night. This exerts pressure on jaw muscles resulting in TMD [1, 8, 11].

Usually, 80% pregnant women when wakes up, if they manage to sleep well, suffer from nausea and early morning sickness. This nausea if not controlled soon after start will progress really fast to vomiting in up to 50% of pregnant women [16]. This is still accepted by most women as normal pregnancy symptom, but the act of vomiting has its impact on TMJ [8, 17]. Frequent vomiting exerts loads of strain on the jaw muscles as well as jaw ligaments. Considering pregnancy morning sickness lasting for 8-18 weeks. This prolonged period may result in sprain of the joint and muscles with subsequent development of TMD [4, 18].

One of the changes of pregnancy is the 50% increase in plasma volume to cope with body expansions and changes. On top of that, extracellular volume increases 30-50% [10, 11]. These physiological measures take place to maintain circulating blood volume and uteroplacental perfusion highest during pregnancy [8, 10, 11]. The massive increase in body fluids during pregnancy is coupled with increasing sodium levels [10, 17]. On the other hand, sodium affects how pregnant women body absorbs and processes water. This normal doubling of body fluids results in the typical puffy, glowing and a bit swollen picture of pregnancy. Furthermore, pressure around jaw and TMJ may increase with subsequent triggering of TMD [2, 10, 11].

Pregnancy usually associated with uncertainty which in turn increase pregnant women anxiety and stress [9]. Additionally, stress is closely associated with both types of bruxism, sleep and awake [12, 15]. Further, women are one and a half times more prone to develop bruxism without pregnancy but during pregnancy, bruxism affects more than 60% of women [13, 14]. Bruxism is characterized by clenching and grinding of teeth with possible thrusting of the mandible. Because of this, bruxism is implicated as causal factor, or at least a risk factor in TMD [8, 12-15].

Normal pregnancy includes many physiological changes. One of these changes is very high increase in demand for calcium [11, 19]. This increase in demand progress more and more as pregnancy progress and women stores are replenished after postpartum period. Associated with increased calcium demand an increase in the production of the

parathyroid hormone [19-21]. Unfortunately, hypocalcaemia affects 30% of pregnant women. Likewise, hypocalcaemia cause bone weakness and jaw pain [19, 21].

Head and neck infections namely, pharyngitis, sinusitis and ear infections are more common during pregnancy than any time in women life [22, 23]. This is due to natural immunological changes of pregnancy making women more prone to infection and inflammation. What is striking is that 9.1% of women with any of the above infections will have TMD [24]. What is fascinating is that in pregnancy the above incidence increases 3.5-9.9 times. Added to that, ear infection with manifested pain is affecting 80% of TMD patients in pregnancy [11, 15, 22, 23].

During pregnancy many women and sadly dentists have poor attitude toward oral hygiene and even treating teeth and oral conditions. This is explained in many studies as incorrect assumptions leading to profound hesitancy from both women and dentists regarding dental care during pregnancy [18, 25]. On top of that, many women tend to neglect taking care of themselves during pregnancy and postpartum since she has many new responsibilities filling all her day [18, 25, 26]. Looking at these two points and the fact that high pregnancy levels of oestrogen and progesterone lead to gingivitis, increased teeth pigmentation and worsening of any dental caries or oral infections [10, 11, 26]. on top of everything just mentioned, there is increased vomiting in pregnancy and more food sweet and savory ingested with progress of the pregnancy. Aggregating all these facts together, show that we have a strong recipe for oral pain, and this soon followed by TMD [16, 26].

Looking back at all mentioned causes and risk factors for developing TMD during pregnancy explains how important and widely present it is. This unhesitatingly point toward preventing TMD. This includes stopping using gum and take care of not to clench and grind teeth. Trying not to sleep on hands (chin on hands), with taking care not to have wide yawning [1, 4, 8]. Knowing the fact that all routine, preventative and treatment oral and dental procedures are safe during pregnancy [19]. Accordingly, treating any teeth infection or conditions. Added to that, avoiding hard, crunchy foods and avoiding big bites. All these measures may help to prevent TMD [6].

There are many treatment options for TMD, but these can be adapted from patient to patient according to the cause and willingness of the patient. One of the easiest treatment options is oral appliances known as bite plates. These are available over the counter and it works by decreasing the tightness of the jaw muscle [4, 6]. Other methods include medications, massage, breathing and Jaw exercise techniques [1, 6]

2. Conclusion

Women of reproductive age are the most affected patients with TMD. Pregnancy complicates the situation more through the natural physiological changes. Explaining how patient can decrease her chances of developing TMD and in worst condition how to treat the condition is crucial. Any antenatal program should include educating pregnant women on TMD and how to prevent it. There is a need for studies on prevalence and incidence of TMD in pregnancy. Moreover, there must be studies on fate of TMD with pregnancy and after delivery.

Compliance with ethical standards

Disclosure of conflict of interest

Both authors declare no conflict of interest what so ever.

References

[1] Solak Ö, N Haktanır, G Köken, H Toktas, Ö Güler, V Kavuncu, Y Demir. *Prevalence of Temporomandibular Disorders in Pregnancy.* European Journal of General Medicine. 2009; 6(4): 223-8.

[2] Warren M, J Fried, *Temporomandibular Disorders and Hormones in Women.* Cells Tissues Organs. 2001; 169: 187-92.

[3] Fichera G, A Polizzi, S Scapellato, G Palazzo, F Indelicato. *Craniomandibular Disorders in Pregnant Women: An Epidemiological Survey.* Journal of Functional Morphology and Kinesiology. 2020; 5(36): 1-12.

[4] Bayramova A. *TMD and pregnancy?* Clinical Journal of Obstetrics and Gynecology. 2018; 1: 001-006.

[5] Bi R, X Zhang, Y Ding, Y Gan. *Progesterone Attenuates Allodynia of Inflamed Temporomandibular Joint through Modulating Voltage-Gated Sodium Channel 1.7 in Trigeminal Ganglion.* Pain Research and Management. 2020; 6582586: 1-11.

[6] Gauer R, M Semidey. *Diagnosis and Treatment of Temporomandibular Disorders.* American Family Physician. 2015; 91(6): 378B-385B.

[7] Guan G, C Kerins, L Bellinger, Kramer. *Estrogenic effect on swelling and monocytic receptor expression in an arthritic temporomandibular joint model.* Journal of Steroid Biochemistry & Molecular Biology. 2005; 97: 241-50.

[8] Hilgenberg P, R Cunali, D Bonotto, A Farias, Cunali. *Temporomandibular disorders and pregnancy.* Revista dor São Paulo. 2012; 13(4): 371-4.

[9] Robinson J, Johnson K Kister, M Yin, J Chen, S Wadhwa. *Estrogen signaling impacts temporomandibular joint and periodontal disease pathology.* Odontology. 2020; 108(2): 153-65.

[10] Costantine M. *Physiologic and pharmacokinetic changes in pregnancy.* Obstetric and Pediatric Pharmacology. 2014; 5(65): 1-5.

[11] Pillay P, C Piercy, H Tolppanen, A Mebazaa. *Physiological changes in pregnancy.* Cardiovascular Africa Journal of Africa. 2016; 27(2): 89-94.

[12] Bergmann A, D Edelhoff, O Schubert, K Erdelt, J Duc. *Effect of treatment with a full-occlusion biofeedback splint on sleep bruxismand TMD pain: a randomized controlled clinical trial.* Clinical Oral Investigations. 2020; 24: 4005-18.

[13] Farwa U, S Imtiaz, D Fatima, A Kiran, A Tariq. *Prevalence of Bruxism among Pregnant Patients of Lahore.* Saudi Journal of Oral and Dental Research. 2020; 5(12): 605-6.

[14] Fluerasu M, I Bocsan, I Tig, S Iacob, D Popa, S Buduru. *The Epidemiology of Bruxism in Relation to Psychological Factors.* International Journal of Enviromental Research and Public Health. 2022; 19: 691-702.

[15] Nota A, L Pittari, M Paggi, S Abati, S Tecco. *Correlation between Bruxism and Gastroesophageal Reflux Disorder and Their Effects on Tooth Wear. A Systematic Review.* Journal of Clinical Medicine. 2022; 11: 1107-13.

[16] Lee N, S Saha. *Nausea and Vomiting of Pregnancy.* Gastroenterology Clinics of North America. 2011; 40(2): 309-36.

[17] Mayoral V, I Espinosa, Á Montiel. *Association between signs and symptoms of temporomandibular disorders and pregnancy (case control study).* Acta Odontologica Latinoamericana. 2013; 26(1): 3-7.

[18] Bahramian H, S Mohebbi, M Khami, R Quinonez. *Qualitative exploration of barriers and facilitators of dental service utilization of pregnant women: A triangulation approach.* BMC Pregnancy and Childbirth. 2018; 18: 153-64.

[19] Almaghamsi A, M Almalki, B Buhary. *Hypocalcemia in Pregnancy: A Clinical Review Update.* Oman Medical Journal. 2018; 33(6): 453-62.

[20] Bako B, A El-Nafaty, D Mshelia, R Gali, B Isa, M Dungus. *Prevalence and Risk Factors of Hypocalcemia among Pregnant and Non-Pregnant Women in Maiduguri, Nigeria: A Cross-Sectional Study.* Nigerian Journal of Clinical Practice. 2022; 24(1): 75-80.

[21] Demir C, M Ersoz. *Biochemical changes associated with temporomandibular disorders.* Journal of International Medical Research. 2018; 47(2): 765-71.

[22] Curcio A, P Shekhawat, A Reynolds, K Thakur, *Neurologic infections during pregnancy*, in *Handbook of Clinical Neurology*, E. Steegers, M. Cipolla, and E. Miller, Editors. 2020; 172 (3rd series) Elsevier. 79-104.

[23] Sherlie V, A Varghese. *ENT Changes of Pregnancy and Its Management.* Indian Journal of Otolaryngology, Head and Neck Surgery. 2014; 66(1): S6-S9.

[24] Jeon Y, J Lee, B Cho, H Rotaru, J Kim, S Kim, *Statistical correlation between pharyngitis and temporomandibular joint disease.* Oral Surgery, Oral Medicine, Oral Pathology, and Oral Radiology, 2005. 99: 671-81.

[25] George A, S Shamim, M Johnson, H Dahlen, S Ajwani, S Bhole, A Yeo. *How Do Dental and Prenatal Care Practitioners Perceive Dental Care During Pregnancy? Current Evidence and Implications.* Birth. 2012; 39(3): 1-10.

[26] Naseem M, Z Khurshid, H Khan, F Niazi, S Zohaib, M Zafar. *Oral health challenges in pregnant women: Recommendations for dental care professionals.* The Saudi Journal for Dental Research. 2016; **7**: 138-46.