

Polycystic Ovary Syndrome and Osteonecrosis of the TMJ, Headache and Sleep Apnea

Rand Larson Redfern, DDS PC; TMD Clinic of Colorado Springs, CO
T.J. Hanson, MD; Mayo Clinic, Rochester, MN

Abstract

Objectives: To increase awareness of medical and dental providers treating young women with complaints of **headache regarding possible association with PCOS**, headache and the hormonal effect on the TMJs. To facilitate earlier diagnosis of PCOS, medical management to help prevent **infertility and other associated maladies, such as headache, sleep apnea, diabetes, osteoporosis, heart disease etc.** To decrease use of pain medications that may lead to **opioid abuse** and increase the quality of life.

Methods: A case study was used.

The Nov. 2014 issue of the British Journal of Oral and Maxillofacial Surgery published an article by Soydan and Deniz reporting that **86% of PCOS** diagnosed young females had very significant to severe **TMD symptoms**. We have added CT and MRI in the diagnosis, evaluation and treatment management. **Mounted study casts were used to fabricate MPO dental occlusal appliances to help protect and rest the joints and musculature** in conjunction with physical therapy and medical treatment for hormone imbalance. Young females were referred for **treatment due to retrobulbar/temporal headache and sleep apnea**.

Results: Palpations revealed very significant musculoskeletal and usually intracapsular pain. **Advanced imaging revealed dislocations of the articular disc, inflammation in capsules and the condylar head, and condylar collapse.** OSN and inflammation within the condyle were seen with MRI. **MPO appliances were useful in reducing headache, decreasing or eliminating need for gabapentin and or opioids and protecting the TMJs.** Headache was a useful sign/symptom for initiating diagnostics and treatment. Headache in young females should stimulate medical evaluation for hormonal maladies, including PCOS.

Conclusions: Headache in young females may be a sign or **symptom** of hormonal disturbances like **PCOS**. Advanced imaging is very useful for diagnosing potential involvement of the entire masticatory system, especially **destruction of the TMJ in PCOS patients**. Dental and medical coordination for earlier diagnosis and treatment of PCOS increases the opportunity to improve outcomes, **decrease drug reliance**, prevention, and improve quality of life. **MPO splints** allow for protection of the TMJs, decreased muscular hyperactivity, decrease headache, **sleep apnea** and prevent osteonecrosis of the condyles.

Case Study No. 1

- Diagnosed with PCOS at age 14, hirsute, non obese (Skinny PCOS)
- Suffered from Headache, dizziness, jaw (ear) pain and school absences
- Referred from orthodontics at age 17 for headache, ear, neck, and musculoskeletal symptoms
- CBCT revealed subchondral sclerosis, cysts, collapse of roof of cyst, and compromised joint space
- MRI revealed synovial tissue thickening due to inflammation, trabecular microfractures, diminished T1 signal of the marrow and displacement of the articular disc
- Medical treatment included hormonal contraception, left oophorectomy and pain medications
- Dental treatment included 24/7 wear of Mutually Protective Occlusal (MPO) Maxillary diagnostic appliance designed to Protect and Rest the Masticatory System and allow the mandible to seek a more physiologic position. Thus unloading the TMJs, decreasing muscular hyperactivity and reducing recruitment and aggravation of the cervicothoracic musculature
- Physical Therapy was utilized

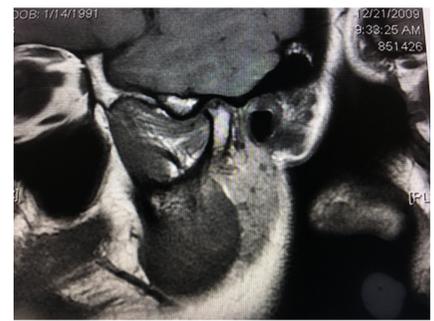
Outcome

- Decreased muscle hyperactivity resulting in decreased headache, ear, TMJ and cervicothoracic pain
- Pain level decreased on analog scale from 10/10 to 2/10
- Increased quality of life, less missed school, less dependence on pain medications

CBCT Anatomage



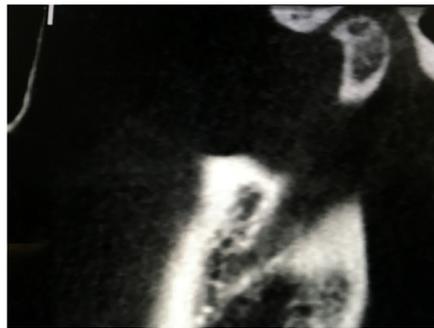
MRI



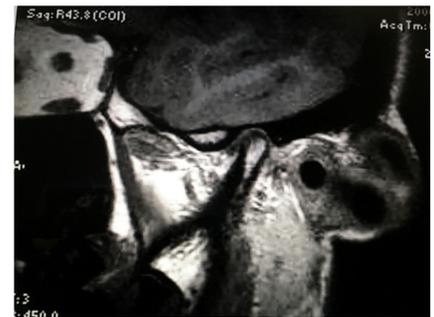
Case Study No. 2

- Nonobese, Non Hirsute teenager
- Presented at age 15 with Headache, acne, and pelvic pain, sleep disorder, poor quality of life
- Primary care MD referred to DDS at age 23 (8 + years following onset of Headache and cervicogenic pain)
- CBCT showed degenerative changes of condylar head, subchondral sclerosis and cysts, decreased joint space, loss of condylar height and change of relationship of the mandible to the maxilla, with open bite and potential airway compromise and resultant muscular hyperactivity, headache, retrobulbar and neck pain
- MRI revealed anterior dislocation and maceration of the articular disc, osteonecrosis probability due to low T1 signal and high T2
- Medical treatment included hormonal contraception and pain medications. She had a prior diagnosis of endometriosis and a new diagnosis of PCOS was established.
- Dental treatment included Maxillary MPO appliance 24/7 adjusted to allow the mandible to seek a more comfortable physiologic position to protect and rest the TMJ and decrease muscular pain. Splint use was decreased to sleep use only when symptoms drastically improved
- Outcome included reduced headache and jaw/ear pain from 10/10 to 2/10, cessation of pain medication, and sleep was improved as was quality of life. Sleep study and evaluation by MD is RX

CBCT Anatomage



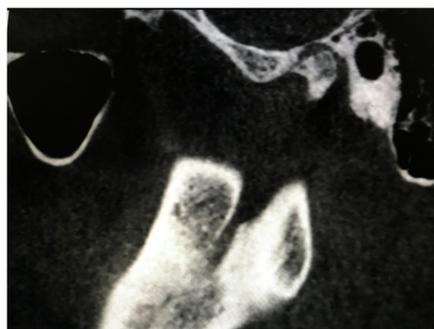
MRI



Case Study No. 3

- Nonobese, non-hirsute young woman, orthodontics as a young teen, used retainer not designed to protect the TMJ
- Headaches treated via multiple pharmacologics and psychiatry since age 14
- History of ovarian cyst resection at age 19
- Referred to DDS at age 21 with retrobulbar headaches, jaw/ear pain and cervicogenic pain especially when under stress. Had missed much of junior and senior high school as well as college and had sleep disorder.
- CBCT reveals extensive degeneration of the mandibular condyles with fossae remodeling. Erosion of cortical surfaces, subchondral bone cysts, decreased joint spaces and severe flattening of the condylar heads
- MRI revealed dislocation of the articular discs, inflammation in soft tissues and decreased marrow signal in the condyles.
- Dental treatment was coordinated with the MD to decreased medication as her pain decreased.
- MPO diagnostic occlusal splint was again utilized and adjusted to protect and rest the TMJs. AS the mandible was allowed to seek a more comfortable position the muscle hyperactivity decreased and more open bite was revealed. Physical therapy was utilized to aid in muscular pain
- Outcome: She had additional ovarian cysts detected and the referring MD diagnosed PCOS. Medication use was drastically decreased and she now isn't missing school or social life. She still uses the appliance sixteen hours daily as the orthodontists and OMS and she are planning her treatment. Her sleep apnea has improve with the decreased muscular hyperactivity and medical monitoring of her sleep.

CBCT Anatomage



MRI



Discussion

PCOS reportedly is a growing malady among young women. Some estimates are now at 16% of females are or will be affected. It has been known for decades that females have a higher prevalence for "TMJ" problems than males. **Hormonal differences and imbalances have been considered a reason for this.** Many authors discuss the effect of hormonal problems and inflammation on the tissues of the TMJ. **However the presence of Headache doesn't appear to be considered a sign or symptom of PCOS.** The effect (Inflammation of the marrow and **Osteonecrosis** and condylar collapse) on the condylar heads associated with PCOS also isn't discussed. The earlier the diagnosis is suspected and made the more sequelae of PCOS can be treated, arrested or prevented.

PCOS patients have a high associated incidence of weight gain, diabetes, heart disease, and sleep apnea! PCOS, like rheumatoid arthritis, may cause condylar breakdown and the resultant effect on the airway. Not all PCOS patients have the triad of PCOS; obesity, hirsutism, and anovulation. There is "Skinny PCOS", these patients can easily not be diagnosed as early and can get more severe condylar breakdown.

Isberg, and others have discussed **Idiopathic Condylar Resorption** and demonstrated **osteonecrosis** of the condyle. The inflammation caused by the hormonal imbalance attracts the ligaments and can penetrate the condylar head causing inflammation in the marrow and can lead to OSN with **collapse** of the condyle. This may be one contributor to idiopathic OSN and collapse of the condyles.

Opioids, gabapentin and pregabapentins are often used to help patients control their pain. Hopefully we can **decrease** the need for these medications and their **sequela** by earlier diagnosis and **conservative** treatment.

Further research needs to be conducted on this topic with coordination of Medical and Dental practitioners. **Advanced Imaging** is central for diagnosis and treatment of the effect of hormonal syndromes on the TMJs. MRI and CT are essential diagnostic modalities for detection of inflammation of the synovium and medullary bone, **prior to collapse.**



Contact: RedfernRI@gmail.com

Conclusion

Headache in young females is a potential symptom of **TMJ** degeneration and of **PCOS**.

Medical and dental collaboration is needed for diagnosis and management of PCOS and to help decrease potential sequela; including **Sleep disorders** and affiliated health disorders as well as decreasing use of medications, **including Opioid use/abuse.**

Dental appliances, designed with biomechanical physiologic principles to protect and rest the TMJs and musculature are useful to treat symptoms and prevent increased TMD associated disorders. **Advanced Imaging is essential.**

The masticatory system is vital. Coordinated clinical research to further evaluate the association of PCOS and TMJ disorders is needed.

References

- Isberg, Annika, ed. Temporomandibular Joint Dysfunction: A Practitioner's Guide. Quintessence Publishing. Hanover Park, IL.
- Soydan SS, Deniz K, Uckan S, Unal AD, Tutunca NB. Is the incidence of temporomandibular disorder increased in polycystic ovary syndrome? British Journal of Oral and Maxillofacial Surgery; Nov 2014; 52(9): 822826
- Warren MP, Fried JL. Temporomandibular disorders and hormones in women. Cells Tissues Organs. 2001; 169:187-192
- Travell, J.G.; Simons, D.G. Myofascial Pain and Dysfunction: The Trigger Point Manual; Vol. 1. The upper Half of Body. Lippincott, William, and Wilkins
- Buggs C, Rosenfield FL. Polycystic ovary syndrome in adolescence. Endocrinol Metab. Clin North Am. 2005 Sep;34(3):677-705
- Gonzales F. Inflammation in polycystic ovary syndrome: underpinning of insulin resistance and ovarian dysfunction. Steroids 2012 Mar 10;77(4):300-5
- Hatcher, D.C.; Faulkner, M.G. (1986). Development of mechanical and mathematic models to study temporomandibular joint loading." J Prosthet Dent 55(3):377-384
- McNeil, C, eds. Engineering Principles and Modeling Strategies/Raymond T Mah, Steven McCoy, David C. Hatcher, M. Gary Faulkner. Quintessence Publishing; Hangover Park IL.
- Arnett GW, Milam SB, Gottesman L. Progressive mandibular retrusion – Idiopathic condylar resorption
- Piper, M.A., Chuong, R. (1991). Avascular necrosis of the mandibular condyle: histologic correlation with MRI. American Society of Temporomandibular Joint Surgeons Annual Meeting, Palm Springs, CA.
- Lobo RA, Carmina E. Importance of diagnosing the polycystic ovary syndrome. Ann Intern Med 2000 Jun 20; 132(12):989-93
- Wang SJ, Fuh JL, Lu SR, Juang KD Chronic daily headache in adolescents; prevalence, impact, and medication overuse. Neurology. 2006 Jan 24;66(2): 193-7
- Gateva A, Kamenov Z, Mondeshki Ts, Bilyukov R, Georgiev O. (Polycystic ovarian syndrome and obstructive sleep apnea). Akush Ginekol (Sofia) 2013;52(3): 63-8
- Upala S, Sanguankeo A, Congrete S. Association Between Obstructive Sleep Apnea and Osteoporosis: A Systemic Review and Meta-Analysis. Int J Endocrinol Metab 2016 Jul 2;14(3):e36317. eCollection 2016.
- zLabarca G, Cruz N R, Descalzi F. (Multisystemic involvement in obstructive sleep apnea). RevMed Chill 2014 Jun;142(6):748-57