**Critically Appraised Topic (CAT)**

|  |
| --- |
| **Project Team:**  |
| **4A-4** |
| **Project Team Participants:**  |
| **Abby Shabel, Jacob Cassaro, Joud Alabyab, Megan Maynard** |
| **Clinical Question:** |
| **What type of occlusal guard is most effective for patients with anterior disc displacement with reduction?** |
| **PICO Format:** |
| **P:** |
| **Patient with anterior disc displacement with reduction.** |
| **I:** |
| **Anterior positioning appliances**  |
| **C:** |
| **Stabilization appliances** |
| **O:** |
| **Reduction in patient’s experienced pain and clicking.** |
| **PICO Formatted Question:** |
| **In patients with disc displacement with reduction, do anterior positioning appliances result in greater reduction in symptoms than stabilization appliances?** |
| **Clinical Bottom Line:** |
| **Anterior repositioning splint (ARS) appliances show great promise in treating patients with anterior disc displacement with reduction. Compared to stabilized splints (SS), anterior repositioning splints were more likely to relieve joint pain and clicking as well as eliminate muscle tenderness than their stabilizing splint counterparts. Anterior repositioning appliances however have their drawbacks. In patients with class I occlusions, anterior repositioning appliances may cause posterior open bites and often times require the additional use of a stabilizing appliance to help ‘settle the oclusion’. Therefore, our patient should be started on a stabilizing splint, given that they too have been shown to provide great improvement in pain management.** |
| **Date(s) of Search:**  |
| **October 18, 2020; October 19, 2020** |
| **Database(s) Used:** |
| **Cochrane Library, Wiley Online Library, PubMed for National Institutes of Health** |
| **Search Strategy/Keywords:** |
| **TMJ disc displacement, occlusal guard intervention, anterior repositioning splint, anterior disc displacement, twin block, occlusal splints** |
| **MESH terms used:** |
| **Dental Occlusion, Temporomandibular Joint Disc, Temporomandibular Joint Disorders, Occlusal Splints, Joint Dislocations** |
| **Article(s) Cited:** |
| 1. **Chen, H.-M., et al. “Physiological Effects of Anterior Repositioning Splint on Temporomandibular Joint Disc Displacement: a Quantitative Analysis.” Journal of Oral Rehabilitation, vol. 44, no. 9, 2017, pp. 664–672., doi:10.1111/joor.12532.**
2. **Liu, Mu-Qing, Lei, Jie, Han, Jian-Hui, Yap, Adrian U-Jin, & Fu, Kai-Yuan. (2017). “Metrical analysis of disc-condyle relation with different splint treatment positions in patients with TMJ disc displacement.” Journal of Applied Oral Science, 25(5), 483-489.** [**https://0-dx-doi-org.libus.csd.mu.edu/10.1590/1678-7757-2016-0471**](https://0-dx-doi-org.libus.csd.mu.edu/10.1590/1678-7757-2016-0471)
3. **Rohida NS, Bhad W. “A clinical, MRI, and EMG analysis comparing the efficacy of twin blocks and flat occlusal splints in the management of disc displacements with reduction.” World J Orthod. 2010 Fall;11(3):236-44. PMID: 20877732.**
 |
| **Study Design(s):** |
| 1. **Individual Cohort Study**
2. **Cross Sectional Study/Individual Cohort Study**
3. **Individual RCT**
 |
| **Reason for Article Selection:** |
| 1. This article seeks to find the short term benefits to using an ARS appliance. ARS appliances are one of the two appliances we are considering to treat our patient. ARS may prove to be beneficial to our patient but the long term effectiveness appears to be variable. In a majority of patients, the disc-to-condyle relationship returned to normal after treatment, implying the need for continuous treatment to maintain results.
2. **This article simply shows the immediate results of stabilizing patients’ occlusion in different positions. These positions represent the positions that would be achieved through ARS or SS.** **The treatment options for our patient are either to use a ARS, an SS or do nothing, each of which this study explores.** **This study serves as a starting point for understanding how occlusal positioning affects disc and condyle positioning.**
3. **This study directly compares the effectiveness of stabilizing splints to repositioning splint, the two treatments of interest, in patients DDwR.** **This study directly applies to our patient, besides for the age group of the sample size.** **Our patient may stand to benefit from either stabilizing splints or anterior repositioning splints. Severity of our patients TMD should be assessed to determine which appliance would best suit him.**
 |
| **Article(s) Synopsis:** |
| 1. 22 patients between the ages 15 and 27 were recruited to be a part of this study. Of these patients, 13 were female and 9 were male. Each patient received an Anterior Repositioning Splint that held their occlusion in an edge-to-edge position. Subject wore their appliance for 3 months continuously, removing only to brush their teeth. Monthly visits were done to ensure compliance and monitor progress. After 3 months, splints were only worn at night. Patients were again recalled after 6 months to assess for signs and symptoms. MRI was done on patients in two appointments, before treatment (max intercuspation, open, with splint) and 6 months afterwards (closed and opened, without ARS). 32 joints were diagnosed with DDwR based on MRI. Mean disc-condyle angle was 52.10 +/- 4.8 (normal: 2.9 +/-4.07). Upon insertion, the mean disc-condyle relationship became -17.93 +/- 3.45 and had no significant difference to the normal joint (-21.92 +/-5.83). After 6 months, no patient was experiencing pain, joint clicking returned in 7 out of 26 joints. According to MRI, only 40.6% of joints were maintained in the normal disc-condyle relationship, the other 59.4% of reduced discs returned to their displaced position. Upon ARS insertion, all patients exhibited a more ideal disc-to-condyle relationship. The majority of patients did not maintain this relationship upon ARS removal, 6 months after treatment. Limitations to this study include not comparing the use of ARS to SS, not following up with patients after 6 months and also having a fairly small sample size.
2. This study recruited 37 patients to examine disc-to-condyle positioning via MRI while their occlusion is stabilized in three different positions (1. Maximum intercuspation, 2. edge-to-edge, and 3. stabilized in most retruded position). Results compared to normal disc-to-condyle angle (-15 - +15 degrees) showed position 1 to cause disc movement anteriorly and inferiorly and position 2 and 3 to cause disc movement posteriorly and superiorly. Position 2 showed a larger improvement than did position 1. The article concludes that both anterior positioning and stabilized positioning may prove to be beneficial in establishing a more normal disc to condyle relationship. Anterior repositioning appears to improve the relationship more so than stabilized positioning. A major limitation to this study includes not following patients over the course of a particular treatment, therefore it cannot speak to the long term effectiveness of either treatment.
3. This study recruited 20 subjects (13 female and 7 male) between 12 and 20 years of age. the sample was randomly split into two groups of ten. Group one was to receive the twin block (ARS) appliance Group 2 was to receive the SS appliance. MRI was used to asses the disc-to-condyle relationship and EMG was used to assess the postural activity of the masseter and temporalis. Patients were instructed to wear their appliance 24 hours a day, including during meals. Patients were recalled at one week, and then every 4 weeks for 6 months. After 6 months appliance use was gradually reduced/discontinued. Patients were again assessed at 12 months. At 12 months, patients with the twin block appliances showed pain relief and reduced clicking in 8 of 10 patients and had an average disc-to-condyle relationship of 4.1 +/- 14.8 degrees compared to 37.4 +/- 4.6 degrees prior to treatment. Stabilizing splint patients also saw an improvement in pain relief for 7 of 10 patients and reduced muscle tenderness in 2 of 3 patients. Elimination of clicking and a maintained disc-to-condyle relationship was seen only in 3 of 10 patients using stabilizing splints. The average disc-to-condyle relationship in patients with stabilizing splints was 25.9 +/- 9.0 degrees post-treatment compared to 33.8 +/- 3.7 degrees pre-treatment. The authors concluded that twin block appliances are effective in reducing pain, clicking and muscle tenderness. Stabilization splints are effective in reducing pain and muscle tenderness but are not as successful in eliminating clicking. It is also noted that twin block appliances may be contraindicated in patietns with class I occlusions due to their tendency to cause posterior open bites. The limitation of this study is its small sample size.
 |
| **Levels of Evidence:** (For Therapy/Prevention, Etiology/Harm) See <http://www.cebm.net/index.aspx?o=1025>[ ]  **1a** – Clinical Practice Guideline, Meta-Analysis, Systematic Review of Randomized Control Trials (RCTs)[x]  **1b** – Individual RCT[ ]  **2a** – Systematic Review of Cohort Studies[x]  **2b** – Individual Cohort Study[x]  **3** – Cross-sectional Studies, Ecologic Studies, “Outcomes” Research[ ]  **4a** – Systematic Review of Case Control Studies[ ]  **4b** – Individual Case Control Study[ ]  **5** – Case Series, Case Reports[ ]  **6** – Expert Opinion without explicit critical appraisal, Narrative Review[ ]  **7** – Animal Research[ ]  **8** – In Vitro Research |
| **Strength of Recommendation Taxonomy (SORT) For Guidelines and Systematic Reviews**See article **J Evid Base Dent Pract 2007;147-150**[x]  **A** – Consistent, good quality patient oriented evidence[x]  **B** – Inconsistent or limited quality patient oriented evidence[ ]  **C** – Consensus, disease oriented evidence, usual practice, expert opinion, or case series for studies of diagnosis, treatment, prevention, or screening |
| **Conclusion(s):** |
| **The evidence presented in these articles, for the most part, apply directly to our patient. The treatments explored directly relate to the pathology that is being experienced. The age group of our patient is older than the average age of study participants but the result I believe are still viable.** **Based on the evidence seen, It would be best to start our patient on a stabilizing appliance. Given the tendency for anterior repositioning appliances to cause posterior open bite, and; given the severity of our patients TMD and his class I occlusion, it would be best to try to avoid its use. Should our patient’s pain persist after using a stabilizing appliance, an anterior repositioning appliance may be a better alternative.** |