**Critically Appraised Topic (CAT)**

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| **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 appliances show great promise in treating patients with anterior disc displacement with reduction. Compared to stabilizing splints, anterior repositioning splints were more likely to relieve joint pain, diminish joint dysfunction, reduce joint clicking, and eliminate muscle tenderness. Stabilizing splints were found to be effective in reducing joint pain but less effective in reducing clicking of the joint. It is noted in some cases, particularly class I occlusions, anterior repositioning may be contraindicated. Use of a twin block appliance (anterior repositioning appliance) on class I patients poses a possible posterior open bite development. It is suggested that, in patients with class I cocclusion, a twin block is positioned such that clicking is eliminated during mouth opening. In order to avoid possible posterior open bite, a stabilizing phase of treatment may be utilized in order to ‘settle’ the occlusion.** |
| **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. **Ma, Zhigui, et al. “Can Anterior Repositioning Splint Effectively Treat Temporomandibular Joint Disc Displacement?” Scientific Reports, vol. 9, no. 1, 2019, doi:10.1038/s41598-018-36988-8.**
4. **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.**
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| **Study Design(s):** |
| 1. **Individual Cohort Study**
2. **Cross Sectional Study**
3. **Individual Cohort Study**
4. **Individual RCT**
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| **Reason for Article Selection:** |
| 1. **This article was selected because it looks at the effects of anterior repositioning appliances over a course of time as well as the longevity of these effects. This article examines the use of anterior repositioning appliances in a short terma dn how those effect remain or diminish.**
2. **This study examines the disc to condyle spatial relationship in patients at three different jaw positions. This article does not look at treatment over a course of time but rather how each treatment directly affects the TMJ. I found this article to be useful in understanding how each of the splint positions (anterior repositioning and stabilizing) physically affect the condyle and disc positioning.**
3. **This article was found using a commercial search engine available to the public. I chose this article to represent the lay research a patient may possibly do on the topic. In addition, I found this article to be very informative and well designed.**
4. **This article directly compares long term use of stabilizing splints to the long term use of anterior repositioning splints. This article also follows up with patients a year after starting treatment to examine the longevity of treatment.**
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| **Article(s) Synopsis:** |
| 1. **This study is designed to analyze the short and long term physiological effects of using an anterior repositioning splint for patients with TMJ anterior disc displacement with reduction. The study recruited 22 patients (13 female and 9 male) and used MRI imaging to examine the disc to condyle relationship before splint treamtment, immediately after inserting appliance, after 3 months of full time anterior repositioning splint use, and again 6 months after the treatment. Patients were instructed to wear the appliance every day for the first three months, removing it only to brush their teeth. After three months of full time use, patients were instructed to wear the appliance only at night. Patientes were examined monthly to ensure compliance with treatment and to monitor the subjective and objective treatment progress.**
2. **This study looks to compare the disc-condyle relationship of patients with disc displacement with reduction while occlusion is held in three different positions. In order to do this, the study recruited 37 patients to examine their disc to condyle positional relationship while their occlusion was held in three positions. The first position was maximal intercuspation, the second position was an edge-to-edge relationship between incisors and the third position was a stabilized position with the mandible in its most retruded position. Each position, with the exception of the first, was stabilized with bite registration material and an MRI image pf the condyle and disc was taken. The purpose of the study was to find the position that allowed for the most ideal disc to condyle position.**
3. **In this study, 72 patients were recruited to examine the effects, both short and long term, of an anterior repositioning splint in the treatment of disc displacemwnt with reduction. Patients with skleletal class II malocclusions and disc displacement with reduction were recruited for this study. Patients were instructed to wear the appliance 24 hours a day, except for brushing, for one to three months. Every 4-6 weeks, the acrylic of the appliance was ground down by 1 mm to promote vertical eruption of posterior teeth with hopes of establishing a class I occlusion. Treatment was considered complete after occlusion was stable with no obvious relapse of the mandible to a more retrusive position after six weeks of no appliance use. MRI was taken of the disc-condyle complex before treatment, after insertion of bite wax, at the end of functional treatment and again at 12 months post-treatment.**
4. **This study looks at the effects of using a twin block appliance versus a stabilizing splint in the treamtment of patients with disc displacement with reduction. In order to do this, 20 subjects (13 female and 7 male) with disc displacement with reduction were recruited and randomly divided into two groups. One group was to be treated using a twin block appliance and the other was to be treated using a stabilizing splint. Both groups were analyzed using MRI and EMG to determine disc spatial relationship to condyle and to examine the postural activity of the masseter and temporalis muscles. Patients were instructed to wear their appliance 24 hours a day for 6 months. Fit was checked a week after the appliances were delivered and then again every 4 weeks for 6 months. After 6 months, patients gradually reduced amount of time appliance was worn, some even stopping completely. Final records were made 12 months after the start of treatment. The study found that twin block appliances successfully reduced pain in 10 out of 10 patients whereas the stabilizing appliance reduced pain in 7 out of 10 patients. Twin block users also saw significantly more reduced clicking noises (8 out of 10 versus 3 out of 10) as well as a more normal disc-condyle relationship.**
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| **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[ ]  **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):** |
| **Based on the evidence seen, anterior repositioning appliances will provide our patient with the most effective treatment in reducing pain and clicking. Treatment may need to be implemented throughout life in order to maintain longevity of results.** |