**Critically Appraised Topic (CAT)**

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| **Project Team:** |
| **9B-2** |
| **Project Team Participants:** |
| **D4- Jose Gonzalez, D3- Sean Townsend, D2 Tamara Faris, D1- Olivia Gloria** |
| **Clinical Question:** |
| **Are Implants, a removable or fixed appliance appropriate for a patient with Down syndrome given their low dental procedure tolerance?** |
| **PICO Format:** |
| **P:** |
| **Patients with Down syndrome** |
| **I:** |
| **Maintaining existing dentition** |
| **C:** |
| **Implant retained dental prosthesis** |
| **O:** |
| **Improve functionality and quality of life** |
| **PICO Formatted Question:** |
| **For patients with Down syndrome, is it better to maintain existing dentition versus implant retained dental prosthesis to improve functionality and achieve a better quality of life?** |
| **Clinical Bottom Line:** |
| **In patients with Down syndrome, a large percentage of individuals who become edentulous in older age. Many individuals lose their teeth due to aggressive periodontitis, making it difficult to wear dentures. This research is being done to determine whether implant therapy are a viable option for dental treatment.** |
| **Date(s) of Search:** |
| **October 10th, 2020**  **October 19th, 2020**  **October 20th, 2020** |
| **Database(s) Used:** |
| **Pubmed, Google Scholar** |
| **Search Strategy/Keywords:** |
| **Intellectual disabilities, dental, implant, Down syndrome** |
| **MESH terms used:** |
| **Treatment, edentualism, Dental care, success rates, outcomes** |
| **Article(s) Cited:** |
| Baus-Domínguez, Maria, et al. “Metallothioneins in Failure of Dental Implants and Periodontitis Down Syndrome Patients.” *Genes*, vol. 10, no. 9, 14 Sept. 2019, p. 711., doi:10.3390/genes10090711.  Najeeb, Shariq, et al. “Outcomes of Dental Implant Therapy in Patients With Down Syndrome: A Systematic Review.” *Journal of Evidence Based Dental Practice*, vol. 17, no. 4, 14 Dec. 2017, pp. 317–323., doi:10.1016/j.jebdp.2017.05.003.  Posse, Jacobo Limeres, et al. “Survival of Dental Implants in Patients with Down Syndrome: A Case Series.” *The Journal of Prosthetic Dentistry*, vol. 116, no. 6, Dec. 2016, pp. 880–884., doi:10.1016/j.prosdent.2016.04.015. |
| **Study Design(s):** |
| 1. Retrospective study of cases and controls 2. **Systematic review** 3. **Multicenter, retrospective, observational study** |
| **Reason for Article Selection:** |
| **I chose these three articles because they all highlighted the studies done on implant treatment outcomes on individuals with patients with Down syndrome. There is very limited research done about restorating dentition in individuals with Down syndrome. They all had similar outcomes to their data allowing for an agreeable outcome to dental treatment in individuals with down syndrome.** |
| **Article(s) Synopsis:** |
| **1)The article written by Baus-Dominguez focused her research to identify the reason implants commonly fail in Down syndrome populations. Since implants are one of the few restorative options for edentulous patients with Down syndrome, she investigated whether genetic alterations in the metabolic pathway of metallothioneins (MT1 and MT2) effected osseointegraton of dental implants. The author compared two groups of individuals, ten individuals without perio disease and successful implants after two year with ten individuals with perio disease and failed implants after two years for a total of 20 patients. The author extracted peripheral blood during dental examination to extract RNA and processing to gene expression. Based on the findings from RNA, the low MT1 and MT2 gene expression were related to the onset of periodontal disease and implant rejection in Down syndrome patients.**  **2) The article written by Najeeb is a systematic review of the outcomes and survival of dental implants placed in jaws of Down syndrome patients. The author selected eight studies out of 156 that met the criteria for 81 implants in 36 Down syndrome patients. The implant loading ranged from immediate to delayed loading with different implant diameters. After following up with patients after the placement of implants, 26 percent of implants failed within 6 years of placement. The article found patients with Down syndrome have a reduced bone density, poor oral hygiene, high susceptibility to periodontal disease, compromised immune response and parafunctional habits may contribute to high implant failure rates in down syndrome patients. The study overall discovered patients with Down syndrome have a higher risk for implant failure. Further studies are needed to understand the mechanism associated with higher risk of implant failure.**  **3) The article written by Posse is a multicenter, retrospective, observational study analyzing dental implant survival in a series of Down syndrome patients. Since Down syndrome patients often lose there teeth due to hypodontia, dental agenesis and periodontal disease, dental implants may be the only choice in some of these patients. A total of 73 implants in 17 patients were observed and 17 implants failed in 8 patients. Majority of implants failures in the study occurred during the osseointegration phase. The Down syndrome population has elevated risk of osteoporosis and immune system dysfunction. The reduced antibody response, T-cell proliferation, and defects of chemotaxis could interfere with the osseointegration process for the implant. The case series found Down syndrome patients have a lower success rate for dental implants than the general populations.** |
| **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)  **1b** – Individual RCT  **2a** – Systematic Review of Cohort Studies  **2b** – Individual Cohort Study  **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**  **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 limited research done on patients with Down syndrome, larger randomized control studies are needed to further understand why dental implants fail within this population. Since individuals with Down syndrome cannot use removable appliances, implants are one of the only options to replace dentition in edentulous patients. Based on the high rates of failure, maintaining dentition would be the better dental treatment for patients with Down syndrome. In conclusion, an implant retained dental prosthesis would not improve the patient’s functionality or quality of life exsisting dention.** |