

# Evidence Based Dental Care for Children with Cerebral Palsy

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This URLEND leadership project involved a comprehensive literature search to discover any peer reviewed research available on the dental treatment of children with Cerebral Palsy. This will allow treatment decisions to be based on evidence rather than tradition or convenience. In addition, the information collected will be distributed to dental care providers via presentations at the annual session of the Utah Dental Association and possibly at the annual session of the American Academy for Cerebral Palsy and Developmental Medicine.

## Introduction and Overview

Throughout this first year of my pediatric dentistry training, I have noticed that we see a fair number of patients with Cerebral Palsy (CP) in our clinic. Most of the time we are able to get a decent exam performed in our clinic, but almost always we resort to using general anesthesia for any care these patients. When I asked my attending dentists about caring for patients with CP I received a variety of responses and their rationale for their treatment philosophies seemed mainly based on traditions they picked up while training in residency. I have learned that children with special health care needs often have a difficult time accessing dental care.<sup>1</sup> It also stands to reason that if care can be accomplished in a clinical setting rather than only in the operating room under general anesthesia, more dentists will be able to offer care to this group of children.

I became interested in knowing what has been researched and published with respect to caring for patients with CP, and decided to pursue this as my URLEND Leadership Project. My intention was that I might discover evidence that would help me to make decisions for clinical treatment and behavior management of children with CP. In addition, a large part of the project involves finding ways to present the information I have found to dental care providers in order that they may feel more comfortable and capable of treating these patients in their practices.

## Methodology and Procedures

To obtain the journal articles, I conducted three separate searches in PubMed. For the first search I combined the MeSH term “Dental Care for Disabled” with the term “Cerebral Palsy.” The second search combined the MeSH term “Dental Care” with the term “Cerebral Palsy.” For the third search I used the term “Cerebral Palsy” and limited it to papers published in dental journals. For all three searches I limited the results to the English language and for studies on human subjects. After combining these searches and removing the duplicate entries there were ninety-three papers identified. Initial review of titles and abstracts led to the elimination of a large number of these studies. Further review of the full text led to the elimination of several more. The majority of the excluded studies involved research that dealt with the dental caries and periodontal disease risk status of children with CP. Others described public health interventions that

had been investigated on a large scale among children with CP and other developmental disabilities to improve access to care. My focus was on finding articles that researched ways to provide treatment to children with CP, or ways to improve their oral hygiene. I was able to identify and review fifteen articles that fit these criteria. Each article was thoroughly evaluated to determine the quality of evidence provided and the potential implications this evidence provides for treating children with CP.

### Results and Discussion

The information collected from these studies can be divided into the following main sections:

- Patient Positioning
- Improved Communication
- Nitrous Oxide
- Oral Premedication
- IV Sedation and General Anesthesia
- Oral Hygiene Improvements

A discussion of each section will follow and the results of the reviewed studies will be summarized.

#### Patient Positioning

An article recently published by Santos and Manzano<sup>2</sup> described a clinical trial where dental care was provided to 158 noninstitutionalized children with CP. The dentists provided a variety of dental treatment ranging from cleanings and exams to dental restorations and oral surgery. Each child was treated with a progressive series of behavioral management techniques ranging from “tell-show-do” communication, assistive stabilization, oral premedication, and general anesthesia. A majority of these patients were able to be treated in the clinic with assistive stabilization. This involved wrapping the child’s arms at the center of the chest, stabilizing the head in a normal position, and placing a roll under the child’s knees to allow the legs to remain comfortably bent. Four other papers that were not actual clinical research, rather they were expert opinion, presented a very similar type of stabilization protocol.<sup>3,4,5,6</sup> This research was encouraging and gave me a solid foundation from which I plan to begin treating children with CP for a broader range of procedures in our clinic.

#### Improved Communication

One study described the use of an “aided augmentative communication system” in dentistry.<sup>7</sup> This paper was more of an expert opinion type of report than an actual clinical trial, but was valuable in that it taught about using a system of communication that the patient was already familiar with. The authors recommended investigating what type of communication treatment the patient receives at their school or therapy sessions, and using that system to facilitate dental treatment.

#### Nitrous Oxide

Two separate studies reported on using nitrous oxide to help control involuntary movements in patients with CP.<sup>8,9</sup> Kaufman et al.<sup>8</sup> provided care to their patients with

and without nitrous oxide sedation, and used physiologic feedback (EMG and reflex testing) to measure the presence of involuntary movements. They found a significant reduction in these movements when the patient was given nitrous oxide (70% nitrous oxide, 30% pure oxygen). The other study<sup>9</sup> was a case report that suggested the same reduction in unwanted movement. This information may prove to be valuable, for nitrous oxide is a very safe, mild sedative that could also allow the treatment of more children in a clinic setting than previously considered possible.

#### Oral Premedication

The clinical trial by Santos and Manzano<sup>2</sup> described previously also involved giving certain patients an oral premedication of midazolam (0.3 mg/kg) to reduce anxiety associated with dental treatment. In addition, Loyola-Rodriguez et al.<sup>10</sup> also reported using an oral premedication in adolescents (diazepam 0.3-0.5 mg/kg) and children (midazolam 0.5 mg/kg), and described it as “an excellent tool” to aid the provision of care in certain patients with CP. It should be noted that an oral sedative will likely not eliminate or significantly reduce unwanted reflex movements in these children, and that most often the patient will still require some form of assistive stabilization. However, the use of an oral sedative premedication in children with CP that demonstrate anxiety at initial dental visits can reduce that anxiety and may make treatment possible in the clinic.

#### IV Sedation and General Anesthesia

One retrospective study<sup>11</sup> described the provision of dental care to children with CP using IV propofol administered by an anesthesiologist in a regular dental clinic. Their conclusion was that this is a very safe and effective procedure if administered by the appropriately trained individual(s) and if patients are selected appropriately. Another study<sup>10</sup> described provision of dental care to children and adolescents under general anesthesia in a non-traditional operating room setting. This took place in a dental school that had a room set up to provide general anesthesia (administered by an anesthesiologist) at a much lower cost than that associated with care at a hospital.

#### Oral Hygiene Improvements

In a randomized controlled trial conducted by Bozkurt et al.,<sup>12</sup> patients with CP were found to have significant improvement in plaque levels and gingival health when their parents and caregivers used an electric toothbrush as opposed to a manual toothbrush. In addition, two studies<sup>13,14</sup> provided evidence that children with CP were better able to brush their own teeth when they were given toothbrushes that had been individually modified. These modifications involved mainly the handle length and size. Another clinical trial<sup>15</sup> showed that children with CP that brushed with a toothpaste containing Triclosan had significantly better gingival health than those that brushed with regular toothpaste. Another study<sup>16</sup> compared the effectiveness of chlorhexidine gluconate in various application methods and found that all three delivery methods (rinse vs. spray vs. gel) reduced plaque and improved gingival health, but that the gel worked the best. It should also be noted that there was evidence of tooth staining in most patients that received the chlorhexidine, and the delivery method was not a factor in the amount of staining observed. These studies will hopefully allow me to make more informed

recommendations to patients with CP and their parents that will improve the oral hygiene and reduce the risk of future dental decay in these children.

Attempting to find and review all pertinent research on providing dental care to children with CP has been very helpful to me and will hopefully allow me to make better clinical decisions. Another aspect of this leadership project involves distributing this information to other dental care providers. I hope to accomplish this by presenting this information at the annual session of the Utah Dental Association this coming February. In addition, I plan to submit an application to present this information as a poster presentation at the annual session of the American Academy for Cerebral Palsy and Developmental Medicine.

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