Dentistry for Children with Down's Syndrome---More Important Than You Know!!

By Dr. Elizabeth Mueller, DDS

The dental care of the child with Down's syndrome presents a challenge to the patient, the parent and the provider. With over 250,000 children affected in the United States, Down's syndrome (DS) accounts for more than 5% of all special needs patients. With the relatively new strategies for inclusion in school, community and workplace, the standard for care for this patient population has been raised considerably, especially in terms of function and esthetics.

But there are special considerations for these patients, which make care more complex and more urgent. These special needs, in the areas of facial development, dental development, periodontal (gum) disease, orthodontic issues and behavioral modifications, make an early start all the more critical to success long term.

Facial Development

Some DS patients have an under-developed "middle face". The top jaw (maxilla) is narrow and short, positioned farther back in relation to the bottom jaw. The term "**mandibular prognathism**" refers to a lower jaw (mandible) that is farther forward than the top jaw (maxilla). This creates an **under-bite** that we see quite often.

In DS patients, the nose is small and flattened; the nasal passages are narrow and can be partially obstructed. One of my sources indicated that two sets of sinus cavities (frontal and sphenoid) can be absent in DS patients and that the maxillary sinus is small in 90 % of the patients. All of this can lead to mouth breathing, instead of breathing through the nose. The tongues of DS patients appear relatively larger but actually the tongues are usually normal in size. Since the top jaw is too small, the tongue only appears larger. Thus, the mouth is left open with the tongue protruding beyond the lips in about 65% of the DS patients. The tongues of DS patients can be quite fissured, creating lots of nooks and crannies for bacteria, creating halitosis (bad breath).

Poor muscle tone in the facial musculature also contributes to mouth breathing and a tongue in the forward position. An **anterior open bite** (front top teeth cannot overlap bottom front teeth at all) can result from the imbalance between the muscle force of the tongue and reduced muscle force of the lips – forcing the front teeth apart. Poor muscle tone also contributes to the downward pull of the mouth. Less efficient chewing and less natural cleansing of the teeth also can result from poor muscle tone. More food may remain on the teeth after eating due to this issue.

In summary, DS patients have a small-undeveloped face with less muscle function and an aberrant breathing pattern.

Dental Development

For DS patients, the teeth can be missing, malformed, poorly calcified, or fused together. Missing teeth have been reported in up to 50% of the patients (general population – 2%). The most frequently missing permanent teeth are the third molars (wisdom teeth), the second bicuspids and the lateral incisors. In 12-17% of DS patients, the primary (baby) lateral incisors are missing. Some patients can be missing many permanent teeth. I have one DS patient who is missing 12 permanent teeth.

Approximately 35-55% of DS patients have extra small teeth (microdontia) and 10% of DS patients have peg-shaped lateral incisors. Some patients can have extra large baby teeth, they can have teeth of varying sizes from side-to-side and they can have teeth that are fused together. The crowns of the teeth can have an odd shape or poor enamel formation. The poor enamel can result from significant illnesses and prolonged fevers. These teeth with bad enamel need extra fluoride and often, they need aggressive restoration. Traditional orthodontics can cause root blunting or shortening; so we must be careful if roots are short before initiation of orthodontic treatment. These small roots can also play a role in early tooth loss due to gum disease.

The eruption of both baby and permanent teeth is delayed in 75% of the cases. Children may be 4-5 years of age before baby teeth are fully erupted. The teeth may also come in an irregular sequence – baby molars may precede incisors. The initial eruption of permanent teeth may be delayed until 8-9 years old. Over-retained baby teeth may give the patient a double row of teeth, especially in the anterior. These over retained teeth usually require extraction. The baby teeth must be kept in excellent condition due to the lack of permanent teeth or slow eruption of permanent teeth. Severe crowding can occur in DS patient who have developed all their teeth. In this case, a series of tooth extractions, under the supervision of an orthodontist, is indicated to alleviate the problem.

To recap, teeth can be missing, extra; small, big, oddly shaped, poorly calcified, out of order and slow in erupting.

Periodontal Considerations

A compromised immune system with a corresponding decrease in the number of T cells is characteristic of most individuals with Down's syndrome. This contributes to a higher rate of infections and is also a factor in the extremely high incidence (90%) of periodontal disease. When compared with similar plaque levels, individuals with DS develop an earlier and more extensive gingivitis and exhibit rapid and generalized periodontal breakdown in adulthood. The disease usually starts between 6 and 15 years old. It progresses, with the most common problem in their mid-thirties is excessive tooth mobility, necessitating extractions. Early loss of lower anterior (front) teeth from gum disease is common and accelerated if the roots are small. The periodontal disease usually affects the lower anteriors and upper (maxillary) molars first. Aggressive, early periodontal treatment, including scaling and root planing (very deep cleaning) every 3-4 months and antimicrobial rinses are indicated. Patients must be able to accept these treatments in order to retain their teeth.

DS patients can also have problems with NUG (necrotizing ulcerative gingivitis), a different kind of bacterial infection of the gums, and more aphthous ulcers (canker sores). DS pediatric patients are also more likely to develop acute leukemia (1 in 200, a 10-15 fold increase) with spontaneous bleeding gums a symptom of that disease.

Obviously, good home care is essential in the management of the periodontal disease. This may be hard to achieve with the intellectual impairment and decreased manual dexterity seen in the DS patient. While manual dexterity increases with age, oral hygiene responsibility will reside with the parent for a much longer period of time.

While gum disease is rampant, the cavity rate is roughly 1/3 the cavity rate of unaffected siblings. The low cavity rate may be due to delayed eruption, extra spacing between the teeth and possible differences in the chemical content of the saliva. We have already touched on the necessity of keeping all baby teeth in good condition. Preventive measures, such as fluoride and sealants (plastic coating of chewing surfaces) are highly recommended. As the DS patient ages, the chronic mouth breathing can decrease saliva and reduce the natural cleansing ability of the mouth. Parotid salivary flow may be decreased. Less saliva always contributes to more cavities in the adult. So the low cavity rate may not last a lifetime.

In summary, while the DS patients are not especially vulnerable to cavities, she/he is incredibly vulnerable to periodontal disease. Traditional periodontal therapy and restorative dentistry are inherently difficult and will be further complicated by the patient's lack of tolerance.

Orthodontic Considerations

The anatomical facial considerations, the tendency to mouth breathing and tongue thrust, poor muscle, and the variability in tooth shape, size and number all contribute to bite/tooth alignment (orthodontic) problems. Almost all DS patients need orthodontic correction. Crowding, anterior crossbite (underbites), posterior crossbites (top jaw too small) and open bites (no overlap of front teeth) are the most common problems. The availability of orthodontic treatment is directly proportional to the level of patient cooperation.

Now, we have a greater understanding of why dental care is so important to the DS patient.

Let's formulate a plan of how achieve it!

Good behavior in the dental office is learned. But in a patient population with delayed learning, this can be a challenge. We need to start early. The first dental visit should occur at 12-18 months of age. We want to provide parents with information about growth and development of the oral cavity. We would like to establish the optimal fluoride intake. We want to talk about dietary practices, the ins and outs of bottle and breast-feeding and the use of pacifiers. We need to practice excellent home care for dental hygiene and utilize techniques that are quick and effective.

The absolute best technique for building tolerance for dental care in the dental office is building tolerance for dental care at home with a parent. An experience created only twice a year will never gain acceptance. We suggest parent's brush and floss their child's teeth twice a day. While standing and facing an appropriate level sink, let the child brush with your assistance while standing behind them, facing the same direction. Initially, no toothpaste is necessary or unfluoridated toothpaste can be used. Up until about age 3-4, no fluoridated toothpaste is recommended. The second brushing of the day should occur with your child's head in your lap while you are seated on your bed or the floor. With just a damp toothbrush, you can easily visualize and clean all surfaces of the teeth while they are recumbent. **Glide floss picks** (commercially available pre-loaded floss with handle) can then be used to floss all the inter-proximal surfaces (in between surfaces) of the teeth while they are lying down. This will closely simulate the posture that will be employed in the dental chair for all dental procedures. The vulnerability of laying supine frightens a child who is not used to it on a daily basis. Being able to lie in a parent's lap is a big, big step!

If your child fights you on this, it may take a two-parent approach initially. The two parents sit knee to knee on straight chairs or stools with the child sitting on one parent's lap, straddling and facing that parent. Then, the child can lay his head in the other parent's lap. The first parent holds the child's hands on his stomach while the second parent does the brushing or flossing. Remember, no toothpaste while lying down! You want to be quick and effective with good visibility. Be sure to offer a good reward for cooperation while brushing, i.e. reading a story or getting a little snack. (It's okay to eat a little after brushing – its long term organized bacterial plaque that we are seeking to disrupt - not food.) Also, establish a consequence (i.e. early bed time, not time for a story) for lack of cooperation and these should both be consistent. The routine should be the same every day.

The first dental exam in the dental office is often done in the lap-to-lap manner, with the dentist playing the part of second parent. If your child has experienced this at home daily, the dental exam will be well tolerated.

We also recommend using one of the inexpensive mechanical toothbrushes because the noise is very similar to the noise of our dental equipment. This will help desensitize your child to the sounds of dentistry. Let them be involved in the selection of these brushes.

If your child clenches his teeth together, just slide your finger along the sides on the teeth, inside the cheek. Go all the way to the last tooth to the gum pads, which have not grown teeth yet. Bend your finger at the first knuckle in towards the tongue. This will make the mouth open and your finger will not get bitten. Your child needs to learn to not bite you before they can learn not to bite the dental providers.

Nothing will replace brushing and flossing while laying down in effectively building dental tolerance. Realize that your child may be resistant, even combative, but persevere. The future of your child's oral health care is at stake.

Pediatric dentists receive an extra two years of training in children's dentistry and special needs patients so I would encourage you to seek out a pediatric dentist for your child. Again, the first visit should be a 12-18 months of age, so you need to see a provider who is comfortable with this age group. There is so much information to convey in this first visit and so many possible problems to assess.

Let the appointment scheduler know that your child has DS and make sure your appointments are in the morning when providers and patients are at their best. If you need antibiotics prior to your dental visit because of heart problems, get a prescription from your child's physician for just this first visit. We will prescribe the antibiotics for all subsequent visits.

The parents in our office will always accompany patients this young throughout the visit. The parents will give us insight into the level of communication appropriate for your child. We realize that many DS patients experience severe delay in expressive language but can understand more than they can express. We use puppetry techniques and tell-show-do techniques if these can be appreciated by your child. Most dental exams are done in the lap-to-lap style. Please let us know if your child experiences neck instability prior to the exam. The exams can be done very quickly and efficiently. A dental prophylaxsis (cleaning) can also be done in this position if it is necessary. In fact, most dental procedures can be accomplished in the early ages in this position as long as the child does not get too tall!

So, in summary, practice all the right dental moves at home, pick a dental provider who is comfortable with small children and children with disabilities, purchase some helpful products and start early! Role-playing the part of the dentist by the parent will make all the difference.

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