Dental Treatment in Down Syndrome Patients:

Prevalence, Barriers, and Interventions

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ABSTRACT

Background: Down Syndrome (DS) is the most common chromosomal disorder, affecting 1/700 live births[1]. With life expectancy averaging 60 years, it is crucial for healthcare professionals to address the needs of this growing population[2]. Common craniofacial features include maxillary hyperplasia, hypodontia, and malocclusions, which can affect functions like speech, chewing, and breathing[3]. These challenges make individuals with DS more likely to require significant dental treatment including specialty treatment[4]. However, despite the benefits of comprehensive dental treatment for patients with DS, there is insufficient understanding of the need and feasibility for specialty treatment, thus leading to inadequate referrals to specialists. **Methods:** DS patients who received orthodontic and prosthodontic referrals at Boston Children's Hospital (BCH) from 2003 to 2023 were reviewed. Patient demographics, medical and dental history, including specialty treatment details, referral, consultation, and treatment duration, were obtained and analyzed. **Results:** Ninety-nine DS patients referred for orthodontic consultation were reviewed. The sample had an even sex distribution with 43.4% >10 years of age at referral. The most common orthodontic issues were maxillary arch crowding (44.4%), crossbites (25.3%), and tooth impaction (16.2%). Among referred, 38.4% proceeded, with 76.3% of them completing treatment. The most frequent reasons for not starting treatment included being lost to follow-up (42.6%) or inadequate cooperation (21.3%). Most of fifteen DS patients with prosthodontic referral were female (73.7%) and >15 years of age (46.7%). Frequent prosthodontic concerns were congenitally missing teeth (73%), peg laterals (13.3%), and acquired tooth loss (13.3%). Forty percents initiated and completed the treatment, including implant-supported prostheses (50.0%), crowns (16.6%), dentures (50.0%), and fixed partial dentures (33.3%). **Conclusions:** Forty percent of DS patients who were referred for specialty treatment proceeded and completed the treatment, indicating the potential for successful dental outcomes when treatment is initiated and supported appropriately. The main barrier to starting treatment was due to loss of follow-up rather than inadequate cooperation, suggesting that ongoing support and monitoring may be key to improving treatment adherence.

MATERIALS AND METHODS

- Patient charts at the Boston Children's Hospital (BCH) Dental Clinic from 2003 to 2023 were screened with the following inclusion criteria: **1)** medical diagnosis of DS, **2)** ≥ 6 years of age, **3)** initial comprehensive or periodic evaluation performed including orthodontic or prosthodontic assessment, 4) at least one additional appointment at the BCH Dental Clinic.
- Patient radiographs, clinical notes, and billing codes were reviewed.
- Patient demographic characteristics were documented.
- Referral, consult, treatment start, and completion dates were noted.
- Barriers to overall treatment success were recorded.

RESULTS

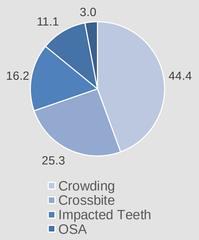
Orthodontic Patients

Our study identified 99 patients with DS who had received orthodontic referral and the demographics (Table 1) and referral reasons (Figure 1) are shown below.

Table 1: Orthodontic Patient Demographics

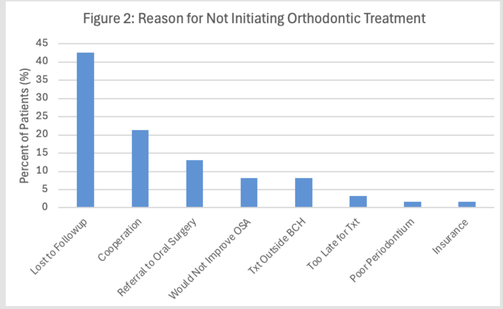
Variable	Category	n (%)
Patients	Total Number	99 (100)
Sex Distribution	Male	52 (52.5)
	Female	47 (47.5)
Age at Referral	≤10 years	28 (28.3)
	>10 years	43 (43.4)
	Unknown	28 (28.3)
Missing Teeth	Yes	55 (55.6)
	No	44 (44.4)
Orthodontic Parameter	Class I	33 (33.3)
	Class II	24 (24.2)
	Class III	42 (42.4)
	Crowding	77 (77.8)
	Openbite	36 (36.4)
	Deeepbite	25 (25.3)
	Crossbite	59 (59.6)
	Impacted Teeth	47 (47.5)
Number of Medical Conditions	≤1	9 (9.1)
	2 or 3	15 (15.2)
	>3	75 (75.7)

Figure 1: Orthodontic Referral Reason (%)



Of referred patients, 61.6% initiated treatment with the reasons for 38.4% of patients not initiating treatment seen below (Figure 2).

Figure 2: Reason for Not Initiating Orthodontic Treatment



Among the patients who initiated the treatment, 76.3% successfully completed their orthodontic treatment.

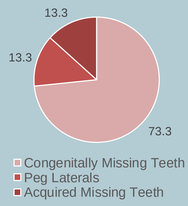
Prosthodontic Patients

Our study identified 15 patients with DS who had received prosthodontic referral and the demographics (Table 2) and referral reasons (Figure 4) are shown below.

Table 2: Prosthodontic Patient Demographics

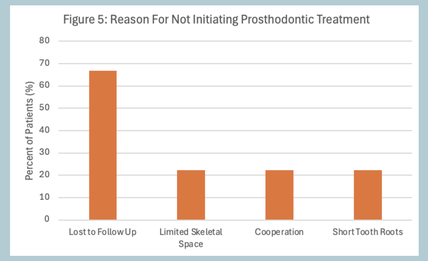
Variable	Category	n (%)
Patients	Total Number	15 (100)
Sex Distribution	Male	4 (26.7)
	Female	11 (73.3)
Age at Referral	≤ 10 years	0 (0.0)
	≤ 15 years	3 (20)
	>15 years	7 (46.7)
	Unknown	5 (33.3)
Missing Teeth	Yes	4 (26.7)
	No	11 (73.3)
Number of Medical Conditons	≤ 1	3 (20)
	2 or 3	7 (46.7)
	>3	5 (33.3)

Figure 4: Prosthodontic Referral Reason (%)



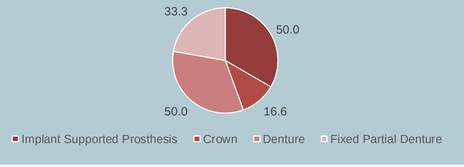
Of referred patients, 40% of patients initiated treatment with the reasons for 60% of patients not initiating treatment seen below (Figure 5).

Figure 5: Reason For Not Initiating Prosthodontic Treatment



All patients who initiated treatment successfully completed treatment with the treatment types shown in Figure 6.

Figure 6: Type of Completed Prosthodontic Treatment (%)



DISCUSSION

Despite the belief that those with DS may not tolerate certain dental treatments due to factors such as hearing loss, anxiety, or difficulty with utilizing appliances, it is clear from the present study that such individuals are able to successfully complete specialty treatment.[5] Moreover, technological advancements in materials and the overall warmness and patience of those with DS have the potential to further facilitate treatment.[6] Because it is increasingly clear that comprehensive dental care and appropriate specialty interventions could significantly improve oral function, aesthetics, and overall quality of life for these individuals, further efforts must be made to target those with DS for early comprehensive dental treatment.

CLINICAL APPLICATIONS

1. DS patients often need specialty care due to their characteristic craniofacial and dental development.
2. Completion of orthodontic and prosthodontic treatment are feasible with DS patients with education and support.
3. General dentists should consider making specialty referrals to orthodontics and prosthodontics early on to support these growing populations.

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