

Recurrence Rate of Gingival Overgrowth in Children with Intellectual Disability Following Periodontal Therapy: A Case Report on 54 Children Treated at Vardavard Day Clinic Charity Center

Ahmad Soolari DMD, MS* and Amin Soolari DDS

Varadavad Day Clinic Charity Center

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***Corresponding author:** Ahmad Soolari DMD, MS, Varadavad Day Clinic Charity Center

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ABSTRACT

Gingival overgrowth involves enlargement of gingival tissue which can occur for a number of reasons including plaque induced inflammatory lesions, medications, genetic conditions, systemic conditions and infective lesions. Gingival overgrowth can affect the quality of life of patients that have it, by causing their smiles to be un-esthetic, as well as other adverse consequences such as abnormal masticatory function, poor occlusal development and compromised nutrition. For plaque induced gingival overgrowth, a number of factors can exacerbate its manifestation such as use of medications that cause gingival overgrowth, malocclusion, poor oral hygiene, genetic conditions, infective lesions and mouth breathing which can dry gingival tissue increasing potential for plaque accumulation. Patients that are mentally disabled present with limitations in their oral health due to potential for motor, sensory and intellectual disability which can impede their ability to perform oral hygiene adequately so they can be prone to conditions such as Periodontal disease, Dental caries and Gingival overgrowth.

The severity of their intellectual disability impacts their treatment modalities and homecare. Our goal with this case study at VDCCC in Iran is to assess to what extent having adequate periodontal therapy and good oral practices, with educational intervention, treatment of behavior symptoms and community based support can be able to prevent recurrence rate of gingival overgrowth for children with mental disability who are classified into trainable and non-trainable groups based on their mental function.

INTRODUCTION

Gingival Overgrowth is a condition with multi factorial etiology that manifests as pathologic growth of gingival tissue usually in response to systemic medications such as anticonvulsants, immunosuppressive agents and calcium channel blockers, infective lesions or genetic conditions. In cases of drug induced overgrowth, its severity is dependent on the ability of the drug to affect gingival tissue as well as the oral hygiene of the patient. ^[1] Bacterial plaque appears to be the contributing factor with severity of overgrowth directly proportional to plaque build up and plaque induced inflammation. ^[2] While the etiology of gingival overgrowth is multi factorial, the mechanism seems to be by inhibition of calcium transport. ² Decreased cation dependent folic acid active transport within gingival fibroblasts causes reduced folic acid intake by cells resulting in changes in the metabolism of matrix metallo proteinases and inhibition of the ability to active collagenase, causing the accumulation of connective tissue and collagen due to lack of collagenase. ^[2]

Gingival overgrowth can be localized around specific teeth or generalized to include the whole mouth. Gingival overgrowth can be classified as mild, moderate or severe depending on its extent. It is classified as Grade 0 given when there is no gingival overgrowth, Grade I occurs for enlargement that only extends to the interproximal area (Mild enlargement), Grade II occurs for enlargement that affects the papillary and marginal gingival (Moderate enlargement) and a score of Grade III occurs for enlargement that not only covers the marginal and interproximal area but also three quarters or more of the crowns of teeth (Severe enlargement).¹⁰ (Figures 1 and 2)



Figure1: Showing severe gingival overgrowth and lobulated consistency of gingival tissue



Figure2: Showing severe gingival overgrowth covering most of the tooth surfaces

The main histologic findings of gingival overgrowth sections involves excessive accumulation of collagen in the gingival extracellular matrix, accumulation of ground substance, in addition to infiltration of inflammatory cells with Plasma cells as the predominant inflammatory cell present. ^[2,3]Prevalence of gingival overgrowth associated with the anti-convulsant Phenytoin use is 50%, while it is 25-30% for immunosuppressive agent Cyclosporin use and 6-15% for calcium channel blocker Nifedipine. ^[3]Most drug induced gingival overgrowth are not distinguishable except for Phenobarbitone and Cyclosporin which can be differentiated from other types of gingival overgrowth by clinical manifestations in the mouth ^[3,4]

Features that differentiate other types of overgrowth from Drug induced gingival overgrowth: ^[4]

- 1) **Inflammatory enlargement:** Acute inflammatory enlargement that appears as a localized gingival swelling. Chronic inflammatory enlargement is deep red, or bluish red, soft, friable with smooth shiny surface and tendency to bleed. Usually secondary to complications of other types of enlargements creating a combined enlargement.
- 2) **Idiopathic/Familial or hereditary enlargement:** Affects attached gingiva as well as gingival margin and interdental papilla. Facial and lingual surfaces of mandible and maxilla are affected, but involvement can be in either jaw. Gingiva is pink, firm consistency with pebbled surface. Its cause is not known.
- 3) **Conditional Enlargement:** Occurs when systemic condition in patient exaggerates or distorts the usual response to dental plaque, includes hormonal (pregnancy or puberty), nutritional (vitamin C deficiency) and allergic (Plasma cell gingivitis). Chronic inflammatory enlargement is present usually interproximally. Plasma cell gingivitis consists of lesions located in the oral aspects of the attached gingiva.
- 4) **Systemic Disease induced Enlargement:** Several systemic diseases such as Leukemia, Sarcoidosis, Tuberculosis and other granulomatous diseases can result in gingival enlargement. Hematologic investigations and histopathologic examination is useful to establish the diagnosis.
- 5) **Neoplastic enlargement or gingival tumors:** Slowly growing cylindrical mass that can be firm, nodular or hard.

- 6) **False enlargement:** These are not true enlargements but appear as such. These increase in size due to increased size of osseous or dental tissue. The gingival presents with no clinical features except increased size in area.

Gingival overgrowth that is induced by drugs are differentiated by:^[4]

- 1) **Phenobarbitone:** For patients taking Phenobarbitone, the gingival is enlarged uniformly without lobulation of the interproximal papilla, and severity of the clinical lesion has been reported to be greater in the posterior than anterior areas.
- 2) **Cyclosporin:** For immune suppressed individuals with gingival overgrowth from use of Cyclosporin, it presents as pebbly and papillary lesions on surfaces of larger lobulations associated with *Candida albicans*. Usually, tissue from Cyclosporin overgrowth is more hyperemic and bleeds easier than tissue associated with phenobarbitone.

In treating patients that have gingival overgrowth the goal is to first initiate Non-surgical therapy. The goal of Non-surgical therapy is to reduce the inflammatory component of the gingival overgrowth, avoiding the need for surgery, as well as to institute meticulous oral hygiene measures to remove plaque and potentially change medication to one that does not cause overgrowth if medication is the underlying cause of gingival Overgrowth. ^[4] Despite reduction of inflammation, change of medication and good plaque control measures, enlarged tissue with gingival overgrowth can still persist. ^[4] The goal of Surgical therapy is to use either scalpel gingivectomy, periodontal flap surgery, electro surgery or use of lasers to remove the excess tissues. The decision to use a flap is dependent on the location of the pockets compared to the muco-gingival junction and if there are bone defects present. The recommendation also is that for some patients such as mentally disabled patients or children, use of electro surgery or lasers can prove to be less invasive and more beneficial to their surgical management. ^[4,5]

Patients that are mentally disabled present with limitations in their oral health due to potential for motor, sensory and intellectual disability which can impede their ability to perform oral hygiene adequately so they can be prone to conditions such as Periodontal disease, Dental caries and gingival overgrowth. The term Mental Disability was replaced by Intellectual disability by the American Psychiatric Association and defined to include problems with general mental abilities affecting function of individuals with regard to intellectual and adaptive functioning. ^[6,8] The American Psychiatric Association changed to the new definition in their 5th edition of the Diagnostic and Statistical manual on Mental Disorders, according to the manual, for a person to be diagnosed as being intellectually disabled, they have to have a deficit in intellectual function, a deficit in adaptive functioning with onset of the deficit starting in childhood with age of onset for the individual less than 18 years. ^[6,8] Intellectual function includes mental activities such as logical reasoning, problem solving, and ability to learn and utilize verbal skills. ^[7,9] Adaptive Behaviors include collection of conceptual, social and practical skills that help people to be able to function in their daily lives. ^[6]

The prevalence of Intellectual Disability affects about 1%-3% of population.⁶ The diagnosis of Intellectual disability involves both a clinical evaluation and judgement as well as formal testing for Cognitive and Adaptive functions.⁶ The treatment of individuals with intellectual disability depends on the underlying cause, the extent of cognitive and adaptive deficit and appropriate support to allow optimal functioning involving a team of professionals from different medical, social and psychological disciplines with care in an integrated coordinated manner. ⁷ (Table 1) gives a summary of the functional skills and support based of level of Intellectual disability.

Table 1:

Classification of Intellectual Disability	Communication and Language	Basic Skills	Support Needed
Mild	Difficulty with acquisition of complex language concepts.	Performs basic self-care, and home activities.	Support on as needed basis. Episodic or short- term. Can achieve independent living as adults with appropriate support.
	Able to complete most multiplication and division problems.		
Moderate	Language and capacity for acquisition of Academic skills for people affected vary. Limited to general skills.	Some may master basic self-care and home activities.	Most require consistent support to achieve independent living and employment.
Severe	Very limited Language and capacity for academic skills.	Have motor	Require regular
		impairments. Require daily support and supervision. May acquire basic self care skills with intensive training.	Consistent lifelong support in school, home or work activities. Care dependent.
Profound	Very little	May also have motor and sensory	High intensity support needed. Limitation on self care,
	communication ability and restricted ability for academic skills.	impairments. Require daily support and supervision.	communication. Care dependent.

While people with mild intellectual disability are able to perform basic self-care and might only require supervision in an as needed basis, people with severe and profound intellectual disability may present with motor and sensory deficit and be in needed high intensity support and may often have to be institutionalized. ⁶ This is especially pronounced in children who require supervision with home care even with mild intellectual disability and for those with severe or profound disability require significant consistent care with maintaining their oral health. In looking at etiology, mild forms of Intellectual disability affects 75% of people that are intellectually disabled, while severe and profound

disability affects a smaller proportion of people and include biologic and genetic causes.

CASEREPORT

Fifty-five children with intellectual disability and average age of 17 years were examined at our facility at the Vardavard Day Clinic Charity Center and diagnosed with gingival overgrowth. A professional team composed of a Pedodontist, Periodontist and a Psychologist examined the patients. They were classified as trainable or non-trainable based on tests and observation by the Psychologist. In this study the variables were gingival overgrowth, malocclusion, trauma and trainability with all the variables studied with NCSS/PASS 2000 software. Determinants of gingival overgrowth were measured on stone models based on the presence of gingival units with increased probing depth (>4mm) as well as the marginal gingival in the bucco-lingual dimensions. Patients that exhibit edmal alignment, facial trauma, malocclusion and severe crowding and cerebral palsy were referred to an Orthodontist, or pediatric dentist for evaluation and specialized instruction given on daily oral hygiene practices. Periodontal therapy started with trainable children (with mild and moderate intellectual disability) and non-trainable children (with severe and profound intellectual disability) were given instruction for oral hygiene along with their care-givers. Non-surgical therapy was initiated involving scaling and root planning to reduce inflammation. General anesthesia was utilized to perform periodontal surgery for non-trainable children while local anesthesia was used for trainable children. All patients were put on 3 month recall visits and recurrence rate of gingival overgrowth was documented over a period of three years.

RESULTS

Psychological analysis disclosed thirty four patients were trainable while twenty one were not trainable. 44% of the trainable patients and 10% of the non-trainable patients had gingival overgrowth in the anterior area. Mouth-breathing did not have statistical significance, 57% of the non trainable and 62% of the trainable patients were mouth breathers. 33% of the non-trainable patients had maxillofacial traumas after periodontal treatments. The recurrence rate of gingival overgrowth was 49% in the non trainable patients all of which developed over the second and third years and 8% for the trainable patients during the third year only. Positive correlation was found between overgrowth severity, gingival inflammation, probing depth, calculus accumulation, and plaque score and the measurement from gingival margin to the muco-gingival junction. (Figure 3,4)



Figure 3: Showing our team at work



Figure 4

DISCUSSION

From our case study on 54 intellectually disabled children that were treated at the Vardavard Day Clinic Charity Center, recurrence rate for gingival overgrowth was low for the trainable patients because care was taken to review administration of oral hygiene by their care givers. For the patients that were not trainable, significantly higher recurrence rate was noted because the non trainable patients presented with significant motor and sensory deficits, their plaque removal may have not been as efficient as with the patients that are trainable. The impact of plaque on Gingival overgrowth is also supported because multiple studies that have noted a positive correlation between the amount of plaque present and the severity of gingival overgrowth. ^[11,12,13]In addressing gingival overgrowth, the

ability to reduce plaque induced inflammation, remove excess tissue and other causes that can impede oral hygiene is essential to preventing recurrence of gingival overgrowth.

When there is a drug inducing the overgrowth, switching to medications that are effective for treating the systemic condition without causing overgrowth is important to preventing recurrence of gingival overgrowth. The high recurrence rate found in children that were non-trainable can be linked to the severity of their intellectual disability, a number of patients with Intellectual Disability also have co-systemic morbidities such as Epilepsy.^[14] More severe Intellectual disability is linked to genetic causes such as Down's syndrome, studies have shown that 8% of children who have Down's syndrome also have Epilepsy.^[15] Patients with gingival over growth from Phenytoin which issued to treat Epilepsy have a high recurrence rate of about 50% so there is potential that the co-morbidity of having Down's syndrome and Epilepsy combined with use of Phenytoin contributed to the high recurrence rate noted for patients with severe and profound intellectual disability.

Treating children with Intellectual disability that present with Gingival overgrowth requires specialized care from a team of dental professionals, with the emphasis to minimize trauma by using minimally invasive techniques such as use of Lasers for removal of excess tissue and General anesthesia for children that are non-trainable and emphasis on ensuring oral hygiene measures are instituted properly by our patients and their care givers. Incorporating their behavioral characteristics was also essential for effective management of their gingival overgrowth.

REFERENCES

- 1) Bajkovec L, Mrzljak A, Likic R, Alajbeg I. Drug induced gingival overgrowth in Cardiovascular patients. World Journal of Cardiology 2021;13(14): 68-75.
- 2) Tungare S, Paraipe AG. Drug Induced gingival overgrowth. Sept. 2022. In: STATPEARLS (Internet); Treasure Island (FL): STATPEARLS 2023.
- 3) Informational Paper: Drug Associated Gingival Enlargement. Journal of Periodontology 2004;75:1424-1431.
- 4) Bharti V, Bansai C. Drug induced Gingival overgrowth. The nemesis of gingiva unraveled. J of Indian Soc. of Periodontology 2013;17(2):182-187.
- 5) Camargo PM, Melnick PR, Flavia Q, Pirih M, Lagos R, and Takei HH. Treatment of Drug-induced gingival enlargement: Aesthetic and functional consideration. Periodontology 2000 ;27:131-138.
- 6) Patel DP, Cabral MD, Ho A, Merrick J. A clinical primer on Intellectual disability. Transl. Pediatrics 2020;9(1): S23-S35.
- 7) Patel DR, Apple R, Kanungo S, Akkal A. Narrative review of intellectual disability: Definition, evaluation and Principles of Treatment. J of Pediatric Medicine 2018.
- 8) APA (American Psychiatric Association) Diagnostic and statistical manual of Mental Disorders, fifth edition. Washington DC. APA 2013.
- 9) Committee to evaluate the supplemental security income disability program for Children with Mental disorders; Board on the Health of select population, Board on children, youth and families. Institute of

Medicine; Division of Behavioral and Social sciences and education; the National Academies of Sciences, Engineering, and Medicine. Boat TF, Wu JT editors Mental Disorders and Disability among low income children. Washington DC: National Academic Press(US);2013 Oct.28,9. Clinical Characteristics of Intellectual disabilities.

- 10) James R. Gingival Overgrowth: An enigma to Periodontists. Galore International Journal of Health Sciences and Research 2017;2(1).
- 11) Gaur S, Agnihotri R. Is dental plaque the only etiologic factor in Amlodipine induced gingival overgrowth? A systematic review of Evidence. J of Clin. Exp. Dent. 2018;10(6): e610-e619.
- 12) Murakami S, Mealey BL, Marriotti A, Chapple IL C. Dental plaque induced gingival conditions. J of Periodontology 2018;89(1): S17-S27.
- 13) Beaumont J, Chesterman J, Kellet M, Durey K. Gingival Overgrowth: Part I: Aetiology and Clinical Diagnosis. British Dental Journal 2017;222(2): 85-91.
- 14) Allard J, Henley W, Mclean B, Sellers A, Hudson S et al. Lasomide in general population in people with intellectual disability. Similar response?. Seizures 2020;76:161-166.
- 15) Valkeburg AJ, De Leeuw TG, Van Dijk M, Tibboel D. Pain in Intellectually disabled children: Towards Evidence based Pharmacotherapy. Paediatric Drugs 2015;17:339-348.