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# Prevalence Of Gingival Hyperpigmentation In Young Female Adult Patients Visiting Hospital- A Retrospective Study

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**Abstract**

Aim Of The Study Was To Determine The Prevalence Of Gingival Hyperpigmentation Amongst The Young Female Adult Patients Visiting Hospital. The Study Was Performed In A Single University Based Study Setting. Data Collection Was Done By Reviewing The Patient Records From July 2019 To March 2020. Data From 149 Individual Patient Records Fitting The Inclusion Criteria Were Randomly Selected In The Study To Determine The Prevalence Of Gingival Hyperpigmentation Amongst The Young Female Population Of Chennai City. As Per Dummett Index The Study Showed Prevalence Of Gingival Hyperpigmentation As Follows: Grade 0 - 23.5% , Grade 1 - 30.9% , Grade 2 - 27.5 % And Grade 3 - 18.1%. Within The Limits Of The Study The Prevalence Of Gingival Hyperpigmentation According To The Dummett Index Was Found As Follows: More In Grade 1 Followed By Grade 2 , Grade 0 , Grade 3 . Awareness About New Techniques For Depigmentation Has To Be Spread In The Selected Population.

**Key Words :** Dummett Index , Chennai Population , Gingival Hyperpigmentation , Retrospective Study , Skin Complexion , Young Adult Females

## 1. Introduction:

Melanin Pigments Are Mostly Found In Basal, Suprabasal Layers Of Epithelium. When The Deposition Occurs In Excess Due To Numerous Reasons Mostly Genetic It Is Termed As Hyperpigmentation [1,2]. Melanocytes Of Dark Skinned People Are Highly Reactive Whereas Those In Light Skin People Show Variability In Reactivity [3,4]. Hyperpigmented Gingiva Is A Major Esthetic Concern In People With A Higher Smile Line As Excess Gingival Exposure With Gummy Smile Is Seen [2]. There Are Several Available Treatment Modalities For Correcting Gingival Hyperpigmentation, Some Of Them Are As Follows : Gingivectomy[5–8] Gingivectomy With Fgg [9,10] Surgical Depigmentation[10] Electrosurgery [11]cryotherapy [12] Liquid Nitrogen Using Gas Expansion System[13]. Use Of Rotary Instruments, Chemical Agents Eg. Phenols , Alcohols [14] Or Latest Technique Lasers [15–17].[18]

As The Genetic Makeup Of People Distributed Over The World Is Different With Respect To Distribution Amongst The Population, A High Amount Of Melanin Granules Are Found In African And East Asian Ethnicity [19]. However All The People Show More Or Less An Amount Of Gingival Pigmentation [2,12,20] . It Has Also Been Found That Hyperpigmentation Is Seen More In Anterior Region And It Gradually Reducer Posteriorly[5] According To Various Survey Carried Out Over The Years In Different Ethnicities It Has Been Found That Fair Skinned People Are Likely To Have Non Pigmented / Lightly Pigmented Gingiva Where As Dark Skinned People Have Higher Channels Of Pigmented Gingiva [5]. 0—89 % Is The Range Of Melanin Deposition Found In Various Populations With Regards To Ethnicity And Smoking Habits [21] Studies Also Show That Heredity And Prevalence Of Pigmentation Are

Interrelated . Previously Our Team Has A Rich Experience In Working On Various Research Projects Across Multiple Disciplines The [22–2425–36].The Aim Of This Retrospective Study Was To Study The Prevalence Of Gingival Hyperpigmentation And Correlating Its Prevalence With Other Possible Causative Factors In Female Adult Patients Visiting Hospital.

**2. Materials And Methods:**

This Study Was Done Under A Single University Retrospective Analytical Study Which Was Carried Out At Saveetha Dental College And Hospital. The Data Collection For The Present Study Was Done After Reviewing 86000 Patient Records From The Period July 2019 To March 2020. Reason Behind Choosing The Single University Setting Was To Make Sure A Large Sample Size And Affordable Treatment. Out Of The Screened Records, 149 Female Patients In The Age Group Of 18-30 Years Were Randomly Selected To Be Included In The Study Who Fulfilled All The Inclusion Criteria Mentioned Below.

**3.1 Inclusion Criteria –**

1) Patients With Complete Case Sheets
2) Patients With Informed Consents.
3) Patients Filling In The Age Group Of 18-30 Years.
4) Only Female Patients
5) Systematically Healthy Patients
6) Patients With Complete Photographic Record With Hd Camera

**3.2 Exclusion Criteria -**

1) Incomplete Patient Records
2) No Informed Consent Form.
3) Below 18 Yrs Or Above 30 Yrs
4) Males Were Excluded.
5) Incomplete Or Poor Quality Photography Records.
6) Patients Undergone Depigmentation Procedures.
7) Patients With Systemic Conditions Which Might Affect Gingival Pigmentation
8) Smokers Were Excluded From The Study.

149 Individuals Who Fulfilled All The Inclusion Criteria And Exclusion Criteria Were Randomly Selected To Be Included In The Study. To Avoid Selection Bias Cases Were Selected By A Third Person Who Was Not Part Of The Study; The Operator Was A Highly Skilled Periodontal Surgeon To Minimize The Assessment Bias.

**3.3 Parameters Assessed:**

1) Gingival Hyperpigmentation

According To Dummett Classification Healthy Gingiva Can Be Of Variable Colors From Pale Pink To Deep Blush Purple [20]. Dummel Et Al Gave The Following Classification Which Has Been Used In The Present Study To Grade The Samples .

0 - No Clinical Pigmentation ( Pink Gingiva )

1 - Mild Clinical Pigmentation (Light Brown )

2 - Moderate Clinical Pigmentation ( Median Brown )

3 - Heavy Clinical Pigmentation ( Deep Brown Or Blush Black )( Dummet Et Al 1964 )

2) Demographic Data
   -Patients Age (Table 12.2 )
   -Sex
3) Skin Complexion Of The Individual (Dark Or Light) (Table 12.1)

Photographic Records Of All Selected Patients Were Assessed In The Current Study. Only Intraoral Frontal Photos Were Selected For Assessment. The Study Was Carried Out After Getting The Necessary Ethical Clearance And Approval From The Ethical And Research Committee From Saveetha University.

**3.4. Statistical Analysis:**

Ibm Spss Version 20 Was Used To Calculate The Prevalence Of Gingival Hyperpigmentation And The Correlations With Other Causative Factors. The Following Statistical Tests Were Done: Chi-Square Test And T-Test To Retrospectively Analyse The Patient Records.

## 4. Results And Discussion:

After Assessment Of 149 Selected Samples Following Results Were Found:
The Calculated Prevalence Of Gingival Hyperpigmentation Was Found To Be Highest In Grade 1 ( 30.9% ) Dummett Index Followed By Grade 2 (27.5%) , Grade 0 (23.5%), And Grade 3 (18.1%) (Table 1) (Figure 1). Light Skin Complexion People Had Most Hyperpigmentation Indices Under Grade 0 (33.3%) And Grade 1 (36.7%) Groups Showed Higher Tendency Of Lesser Gingival Pigmentation In Comparison To The Dark Skin Complexion (Table 2). Percentage Of Individuals Of Dark Complexion In Grade 2 And Grade 3 Was 39% And 30.5% Respectively (Figure 2). Distribution Of The Various Dummett Indices In Different Age Groups Are Given In Table 3. The Mean Age Plot Of The Study Population Is Given In Figure 3. No Statistical Significance Was Found In The Results Of Skin Complexion And Age Groups Due To Limited Data Availability In The Patient Records. The Results Coincide With The Study By Deepa Ponnaiyan Et Al [37] Where No Statistical Significance Was Found In The Correlation Of Age With The Prevalence Of Gingival Hyperpigmentation As Only Young Female Adult Samples Were Selected To Be Included In The Study. Statistically Significant Increase In The Intensity And Distribution To The Posterior Gingiva Of The Melanin Pigmentation Has Been Found With Increase In Age.[38]

Gingival Hyperpigmentation Can Be A Major Aesthetic Concern For The People Who Are Conscious About Their Look And Have A High Lip Line. Patients' Knowledge About The Condition And Available Treatment Is Insufficient In The Selected Population. Dummett Et Al [8,20,39–45] Surveyed Attitudes Of Patients Towards Gingival Pigmentation Towards Gingival Pigmentation And Found Out That Pink Gingiva Was Found To Be The Ideal One. According To Shaukar Et Al. Perception Between Males And Females Is Not Statistically Significant; This Study Also Sheds Light On The Fact That Perception Did Not Vary With Age Or Gender. Melanin Pigmentation Occurs In All Races And Can Appear At Any Age. [12,46] Our Institution Is Passionate About High Quality Evidence Based Research And Has Excelled In Various Fields ( [47–57.]

In The Present Study More Number Of Individuals Were Classified Into Grade 1 And Grade 2 Which Is Reflected In The Study Done By Many Researchers Which States The African And Southeast Asian Countries Show Higher Degree Of Pigmentation.[40,43,58]

No Similar Studies Have Been Carried Out In The Selected Demographic Region, So This Data Could Serve For Better Prospective Analysis Of Gingival Hyperpigmentation With Established Treatment Modalities. Other Published Studies Show That People's Knowledge About The Condition And Possible Treatment Is Very Less.Most Of The Recent Published Studies About The Gingival Hyperpigmentation Are About The Possible Treatment Modalities And Case Reports [8,10,39,59–63]. So The Retrospective Data From The Present Study Could Serve Well For The Future Studies.

## 5. Limitations :

Limitations Of The Study Were As Follows

1. Single University Based Study Setting Which Can Infer That People Only From A Specific Region Of The City Were Screened.
2. Convenience Sampling.
3. Sample Size Is Considerably Small.

4. Only Females Were Screened.
5. Single Operator Assessment Bias.

**6. Future Scope Of The Study :**

With The Help Of This Study We Can Calculate / Approximate In Which Class Most Of The People In The Selected Region Fall Into And Can Spread Awareness About The Condition And Available Treatments And Advancements In The Field.

**7. Conclusion :-**

As There Is A Lacunae In The Literature For Similar Studies Done In This Demographic Region, The Results From The Prevalence Of The Gingival Hyperpigmentation Could Give Better Understanding About The General Perception About The Patient Aesthetics In Gingiva And Their Prevalence. The Awareness Of The Available Treatments In The Selected Region Was Less Than Expected And This Study Would Help Us To Analyse The Category In Which Most Of The Female / People In The Selected Demographic Population Fall Into, So That Appropriate Awareness And Education Can Be Spread About The Condition And Possible Treatment Modalities.

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**9. Conflict Of Interest:**

The Authors State That There Are No Competing Interests.

**10. References:**

1. Gupta G. Management Of Gingival Hyperpigmentation By Semiconductor Diode Laser. J Cutan Aesthet Surg [Internet]. 2011; Available From: Https://Www.Ncbi.Nlm.Nih.Gov/Pmc/Articles/Pmc3263135/

2. Dummett Co, Gupta Op. Estimating The Epidemiology Of Oral Pigmentation. Q Natl Dent Assoc [Internet]. 1966 Apr;24(3):81–6. Available From: Https://Www.Ncbi.Nlm.Nih.Gov/Pubmed/5221847

3. Schroeder He. Melanin Containing Organelles In Cells Of The Human Gingiva I. Epithelial Melanocytes. J Periodontal Res [Internet]. 1969 Feb 1;4(1):1–18. Available From: Https://Doi.Org/10.1111/J.1600-0765.1969.Tb01940.X

4. Szabó G, Gerald Ab, Pathak Ma, Fitzpatrick Tb. Racial Differences In The Fate Of Melanosomes In Human Epidermis. Nature [Internet]. 1969 Jun 14;222(5198):1081–2. Available From: Http://Dx.Doi.Org/10.1038/2221081a0

5. Tamizí M, Taheri M. Treatment Of Severe Physiologic Gingival Pigmentation With Free Gingival Autograft. Quintessence Int [Internet]. 1996; Available From: Http://Search.Ebscohost.Com/Login.Aspx?Direct=True&Profile=Ehost&Scope=Site&Authtype=Crawler&Jrnl=00336572&An=38506436&H=Fvdgopceza5%2fw%2b0jxl254oxl9gx%2fmlykaf8%2bqh8kppiafdhw8b5tchm621ejfh8xxau8%2bhihik%2b8cy6ani9qyg%3d%3d&Crl=C

6. Singh V, Giliyar Sb, Kumar S, Bhat M. Comparative Evaluation Of Gingival Depigmentation By Diode Laser And Cryosurgery Using Tetrafluoroethane: 18-Month Follow-Up. Clinical Advances In Periodontics [Internet]. 2012;2(3):129–34. Available From: Https://Onlinelibrary.Wiley.Com/Doi/Abs/10.1902/Cap.2012.110008

7. Kumar S, Bhat Gs, Bhat Km. Effectiveness Of Cryogen Tetrfluoroethane On Elimination Of Gingival Epithelium And Its Clinical Application In Gingival Depigmentation-Histological Findings And Case Series. J Clin Diagn Res [Internet]. 2013 Dec;7(12):3070–2. Available From:

Http://Dx.Doi.Org/10.7860/Jcdr/2013/5353.3855

8. Panda S, Jayakumar Nd, Sankari M, Varghese Ss, Kumar Ds. Platelet Rich Fibrin And Xenograft In Treatment Of Intrabony Defect. Contemp Clin Dent [Internet]. 2014 Oct;5(4):550–4. Available From: Http://Dx.Doi.Org/10.4103/0976-237x.142830

9. Lagdive S, Doshi Y, Marawar Pp. Management Of Gingival Hyperpigmentation Using Surgical Blade And Diode Laser Therapy: A Comparative Study. Journal Of Oral Laser Applications [Internet]. 2009;9(1). Available From: Https://Jola.Quintessenz.De/Jola_2009_01_S0041.Pdf

10. Gnanasekhar Jd, Al-Duwairi Ys. Electrosurgery In Dentistry. Quintessence Int [Internet]. 1998 Oct;29(10):649–54. Available From: Https://Www.Ncbi.Nlm.Nih.Gov/Pubmed/9922763

11. Tal H, Landsberg J, Kozlovsky A. Cryosurgical Depigmentation Of The Gingiva. A Case Report [Internet]. Vol. 14, Journal Of Clinical Periodontology. 1987. P. 614–7. Available From: Http://Dx.Doi.Org/10.1111/J.1600-051x.1987.Tb01525.X

12. Dummett Co, Bolden Te. Postsurgical Clinical Repigmentation Of The Cingivae. Oral Surgery, Oral Medicine, Oral [Internet]. 1963; Available From: Https://Www.Oooojournal.Net/Article/0030-4220(63)90299-8/Pdf

13. Almas K, Sadig W. Surgical Treatment Of Melanin-Pigmented Gingiva; An Esthetic Approach. Indian J Dent Res [Internet]. 2002 Apr;13(2):70–3. Available From: Https://Www.Ncbi.Nlm.Nih.Gov/Pubmed/12420570

14. Ginwalla Tm, Gomes Bc, Varma Br. Surgical Removal Of Gingival Pigmentation. (A Preliminary Study). J Indian Dent Assoc [Internet]. 1966 Jun;38(6):147–50 Passim. Available From: Https://Www.Ncbi.Nlm.Nih.Gov/Pubmed/5223321

15. Sabrinath B, Sivapathasundharam B, Gaurav G, Dhivya. Pigmentation. Indian Journal Of Dental Advancements [Internet]. 2009;1:38+. Available From: Https://Go.Gale.Com/Ps/I.Do?Id=Gale%7ca286255756&Sid=Googlescholar&V=2.1&It=R&Linkaccess=Abs&Issn=22295038&P=Aone&Sw=W

16. Yousuf A, Hossain M, Nakamura Y, Yamada Y, Kinoshita J, Matsumoto K. Removal Of Gingival Melanin Pigmentation With The Semiconductor Diode Laser: A Case Report. J Clin Laser Med Surg [Internet]. 2000 Oct;18(5):263–6. Available From: Http://Dx.Doi.Org/10.1089/Clm.2000.18.263

17. Atsawasuwan P, Greethong K, Nimmanon V. Treatment Of Gingival Hyperpigmentation For Esthetic Purposes By Nd:Yag Laser: Report Of 4 Cases. J Periodontol [Internet]. 2000 Feb;71(2):315–21. Available From: Http://Dx.Doi.Org/10.1902/Jop.2000.71.2.315

18. Ramesh A, Varghese Ss, Jayakumar Nd, Malaiappan S. Chronic Obstructive Pulmonary Disease And Periodontitis – Unwinding Their Linking Mechanisms [Internet]. Vol. 58, Journal Of Oral Biosciences. 2016. P. 23–6. Available From: Http://Dx.Doi.Org/10.1016/J.Job.2015.09.001

19. Fry L, Almeyda Jr. The Incidence Of Buccal Pigmentation In Caucasoids And Negroids In Britain. Br J Dermatol [Internet]. 1968 Apr;80(4):244–7. Available From: Http://Dx.Doi.Org/10.1111/J.1365-2133.1968.Tb11966.X

20. Dummett Co. A Classification Of Oral Pigmentation [Internet]. Vol. 127, Military Medicine. 1962. P. 839–40. Available From: Http://Dx.Doi.Org/10.1093/Milmed/127.10.839

21. Bergamaschi O, Kon S, Doine Ai, Ruben Mp. Melanin Repigmentation After Gingivectomy: A 5-Year

Clinical And Transmission Electron Microscopic Study In Humans. Int J Periodontics Restorative Dent [Internet]. 1993;13(1):85–92. Available From: Https://Www.Ncbi.Nlm.Nih.Gov/Pubmed/8330948

22. Hafeez N, Others. Accessory Foramen In The Middle Cranial Fossa. Research Journal Of Pharmacy And Technology [Internet]. 2016;9(11):1880. Available From: Https://Search.Proquest.Com/Openview/3790b1bd527fc74251e9798d8ab23bc8/1?Pq-Origsite=Gscholar&Cbl=1096441

23. Krishnan Rp, Ramani P, Sherlin Hj, Sukumaran G, Ramasubramanian A, Jayaraj G, Et Al. Surgical Specimen Handover From Operation Theater To Laboratory: A Survey. Ann Maxillofac Surg [Internet]. 2018 Jul;8(2):234–8. Available From: Http://Dx.Doi.Org/10.4103/Ams.Ams_51_18

24. Somasundaram S, Ravi K, Rajapandian K, Gurunathan D. Fluoride Content Of Bottled Drinking Water In Chennai, Tamilnadu. J Clin Diagn Res [Internet]. 2015;9(10):Zc32. Available From: Https://Www.Ncbi.Nlm.Nih.Gov/Pmc/Articles/Pmc4625331/

25. Felicita As, Sumathi Felicita A. Orthodontic Extrusion Of Ellis Class Viii Fracture Of Maxillary Lateral Incisor – The Sling Shot Method [Internet]. Vol. 30, The Saudi Dental Journal. 2018. P. 265–9. Available From: Http://Dx.Doi.Org/10.1016/J.Sdentj.2018.05.001

26. Kumar S, Rahman R. Knowledge, Awareness, And Practices Regarding Biomedical Waste Management Among Undergraduate Dental Students. Asian J Pharm Clin Res [Internet]. 2017 Aug 1;10(8):341. Available From: Https://Innovareacademics.In/Journals/Index.Php/Ajpcr/Article/View/19101

27. Gurunathan D, Shanmugaavel Ak. Dental Neglect Among Children In Chennai. J Indian Soc Pedod Prev Dent [Internet]. 2016 Oct 1 [Cited 2020 Jun 8];34(4):364. Available From: Http://Www.Jisppd.Com/Article.Asp?Issn=0970-4388;Year=2016;Volume=34;Issue=4;Spage=364;Epage=369;Aulast=Gurunathan

28. Sneha S, Others. Knowledge And Awareness Regarding Antibiotic Prophylaxis For Infective Endocarditis Among Undergraduate Dental Students. Asian Journal Of Pharmaceutical And Clinical Research [Internet]. 2016;154–9. Available From: Https://Innovareacademics.Info/Journals/Index.Php/Ajpcr/Article/Download/13405/8142

29. Dhinesh B, Isaac Joshuaramesh Lalvani J, Parthasarathy M, Annamalai K. An Assessment On Performance, Emission And Combustion Characteristics Of Single Cylinder Diesel Engine Powered By Cymbopogon Flexuosus Biofuel. Energy Convers Manage [Internet]. 2016 Jun 1;117:466–74. Available From: Https://Www.Sciencedirect.Com/Science/Article/Pii/S0196890416301868

30. Choudhari S, Thenmozhi Ms. Occurrence And Importance Of Posterior Condylar Foramen. Laterality [Internet]. 2016;8:11–43. Available From: Https://Rjptonline.Org/Html_Papers/Research%20journal%20of%20pharmacy%20and%20technology__Pid__2016-9-8-15.Html

31. Paramasivam A, Vijayashree Priyadharsini J, Raghunandhakumar S. N6-Adenosine Methylation (M6a): A Promising New Molecular Target In Hypertension And Cardiovascular Diseases. Hypertens Res [Internet]. 2020 Feb;43(2):153–4. Available From: Http://Dx.Doi.Org/10.1038/S41440-019-0338-Z

32. Wu F, Zhu J, Li G, Wang J, Veeraraghavan Vp, Krishna Mohan S, Et Al. Biologically Synthesized Green Gold Nanoparticles From Siberian Ginseng Induce Growth-Inhibitory Effect On Melanoma Cells (B16). Artif Cells Nanomed Biotechnol [Internet]. 2019 Dec;47(1):3297–305. Available From: Http://Dx.Doi.Org/10.1080/21691401.2019.1647224

33. Palati S, Ramani P, Shrelin H, Sukumaran G, Ramasubramanian A, Don Kr, Et Al. Knowledge, Attitude And Practice Survey On The Perspective Of Oral Lesions And Dental Health In Geriatric Patients Residing In Old

Age Homes [Internet]. Vol. 31, Indian Journal Of Dental Research. 2020. P. 22. Available From: Http://Dx.Doi.Org/10.4103/Ijdr.Ijdr_195_18

34. Saravanan M, Arokiyaraj S, Lakshmi T, Pugazhendhi A. Synthesis Of Silver Nanoparticles From Phenerochaete Chrysosporium (Mtcc-787) And Their Antibacterial Activity Against Human Pathogenic Bacteria. Microb Pathog [Internet]. 2018 Apr;117:68–72. Available From: Http://Dx.Doi.Org/10.1016/J.Micpath.2018.02.008

35. Govindaraju L, Gurunathan D. Effectiveness Of Chewable Tooth Brush In Children-A Prospective Clinical Study. J Clin Diagn Res [Internet]. 2017;11(3):Zc31. Available From: Https://Www.Ncbi.Nlm.Nih.Gov/Pmc/Articles/Pmc5427431/

36. Vijayakumar Jain S, Muthusekhar Mr, Baig Mf, Senthilnathan P, Loganathan S, Abdul Wahab Pu, Et Al. Evaluation Of Three-Dimensional Changes In Pharyngeal Airway Following Isolated Lefort One Osteotomy For The Correction Of Vertical Maxillary Excess: A Prospective Study. J Maxillofac Oral Surg [Internet]. 2019 Mar;18(1):139–46. Available From: Http://Dx.Doi.Org/10.1007/S12663-018-1113-4

37. Ponnaiyan D, Jegadeesan V, Perumal G. Correlating Skin Color With Gingival Pigmentation Patterns In South Indians–A Cross Sectional Study. Oral Health Dent Manag [Internet]. 2014; Available From: Http://Citeseerx.Ist.Psu.Edu/Viewdoc/Download?Doi=10.1.1.963.9019&Rep=Rep1&Type=Pdf

38. Janiani P, Bhat Pr, Trasad Va, Acharya Ab, Thakur Sl. Evaluation Of The Intensity Of Gingival Melanin Pigmentation At Different Age Groups In The Indian Population: An Observational Study. J Indian Soc Pedod Prev Dent [Internet]. 2018 Oct;36(4):329–33. Available From: Http://Dx.Doi.Org/10.4103/Jisppd.Jisppd_192_17

39. Ramesh A, Varghese Ss, Doraiswamy Jn, Malaiappan S. Herbs As An Antioxidant Arsenal For Periodontal Diseases. J Intercult Ethnopharmacol [Internet]. 2016 Jan;5(1):92–6. Available From: Http://Dx.Doi.Org/10.5455/Jice.20160122065556

40. Ravi S, Malaiappan S, Varghese S, Jayakumar Nd, Prakasam G. Additive Effect Of Plasma Rich In Growth Factors With Guided Tissue Regeneration In Treatment Of Intrabony Defects In Patients With Chronic Periodontitis: A Split-Mouth Randomized Controlled Clinical Trial. J Periodontol [Internet]. 2017;88(9):839–45. Available From: Https://Aap.Onlinelibrary.Wiley.Com/Doi/Abs/10.1902/Jop.2017.160824

41. Varghese Ss, Thomas H, Jayakumar Nd, Sankari M, Lakshmanan R. Estimation Of Salivary Tumor Necrosis Factor-Alpha In Chronic And Aggressive Periodontitis Patients. Contemp Clin Dent [Internet]. 2015 Sep;6(Suppl 1):S152–6. Available From: Http://Dx.Doi.Org/10.4103/0976-237x.166816

42. Mootha A, Malaiappan S, Jayakumar Nd, Varghese Ss, Toby Thomas J. The Effect Of Periodontitis On Expression Of Interleukin-21: A Systematic Review. Int J Inflam [Internet]. 2016 Feb 22;2016:3507503. Available From: Http://Dx.Doi.Org/10.1155/2016/3507503

43. Khalid W, Varghese Ss, Sankari M, Jayakumar Nd. Comparison Of Serum Levels Of Endothelin-1 In Chronic Periodontitis Patients Before And After Treatment. J Clin Diagn Res [Internet]. 2017 Apr;11(4):Zc78–81. Available From: Http://Dx.Doi.Org/10.7860/Jcdr/2017/24518.9698

44. Priyanka S, Kaarthikeyan G, Nadathur Jd, Mohanraj A, Kavarthapu A. Detection Of Cytomegalovirus, Epstein-Barr Virus, And Torque Teno Virus In Subgingival And Atheromatous Plaques Of Cardiac Patients With Chronic Periodontitis. J Indian Soc Periodontol [Internet]. 2017 Nov;21(6):456–60. Available From: Http://Dx.Doi.Org/10.4103/Jisp.Jisp_205_17

45. Ramamurthy J, Mg V. Comparison Of Effect Of Hiora Mouthwash Versus Chlorhexidine Mouthwash In

Gingivitis Patients: A Clinical Trial [Internet]. Vol. 11, Asian Journal Of Pharmaceutical And Clinical Research. 2018. P. 84. Available From: Http://Dx.Doi.Org/10.22159/Ajpcr.2018.V11i7.24783

46. Hawkins Nm, Virani S, Ceconi C. Heart Failure And Chronic Obstructive Pulmonary Disease: The Challenges Facing Physicians And Health Services. Eur Heart J [Internet]. 2013 Sep;34(36):2795–803. Available From: Http://Dx.Doi.Org/10.1093/Eurheartj/Eht192

47. Vijayashree Priyadharsini J. In Silico Validation Of The Non-Antibiotic Drugs Acetaminophen And Ibuprofen As Antibacterial Agents Against Red Complex Pathogens. J Periodontol [Internet]. 2019 Dec;90(12):1441–8. Available From: Http://Dx.Doi.Org/10.1002/Jper.18-0673

48. Pc J, Marimuthu T, Devadoss P. Prevalence And Measurement Of Anterior Loop Of The Mandibular Canal Using Cbct: A Cross Sectional Study. Clin Implant Dent Relat Res [Internet]. 2018; Available From: Https://Europepmc.Org/Article/Med/29624863

49. Ramesh A, Varghese S, Jayakumar Nd, Malaiappan S. Comparative Estimation Of Sulfiredoxin Levels Between Chronic Periodontitis And Healthy Patients - A Case-Control Study. J Periodontol [Internet]. 2018 Oct;89(10):1241–8. Available From: Http://Doi.Wiley.Com/10.1002/Jper.17-0445

50. Ramadurai N, Gurunathan D, Samuel Av, Subramanian E, Rodrigues Sjl. Effectiveness Of 2% Articaine As An Anesthetic Agent In Children: Randomized Controlled Trial. Clin Oral Investig [Internet]. 2019 Sep;23(9):3543–50. Available From: Http://Dx.Doi.Org/10.1007/S00784-018-2775-5

51. Sridharan G, Ramani P, Patankar S, Vijayaraghavan R. Evaluation Of Salivary Metabolomics In Oral Leukoplakia And Oral Squamous Cell Carcinoma. J Oral Pathol Med [Internet]. 2019 Apr;48(4):299–306. Available From: Http://Dx.Doi.Org/10.1111/Jop.12835

52. Ezhilarasan D, Apoorva Vs, Ashok Vardhan N. Syzygium Cumini Extract Induced Reactive Oxygen Species-Mediated Apoptosis In Human Oral Squamous Carcinoma Cells. J Oral Pathol Med [Internet]. 2019 Feb;48(2):115–21. Available From: Http://Dx.Doi.Org/10.1111/Jop.12806

53. Mathew Mg, Samuel Sr, Soni Aj, Roopa Kb. Evaluation Of Adhesion Of Streptococcus Mutans, Plaque Accumulation On Zirconia And Stainless Steel Crowns, And Surrounding Gingival Inflammation In Primary Molars: Randomized Controlled Trial. Clin Oral Investig [Internet]. 2020;1–6. Available From: Https://Link.Springer.Com/Article/10.1007/S00784-020-03204-9

54. Samuel Sr. Can 5-Year-Olds Sensibly Self-Report The Impact Of Developmental Enamel Defects On Their Quality Of Life? Int J Paediatr Dent [Internet]. 2021 Mar;31(2):285–6. Available From: Http://Dx.Doi.Org/10.1111/Ipd.12662

55. R H, Hannah R, Ramani P, Ramanathan A, R Jm, Gheena S, Et Al. Cyp2 C9 Polymorphism Among Patients With Oral Squamous Cell Carcinoma And Its Role In Altering The Metabolism Of Benzo[A]Pyrene [Internet]. Vol. 130, Oral Surgery, Oral Medicine, Oral Pathology And Oral Radiology. 2020. P. 306–12. Available From: Http://Dx.Doi.Org/10.1016/J.Oooo.2020.06.021

56. Chandrasekar R, Chandrasekhar S, Sundari Kks, Ravi P. Development And Validation Of A Formula For Objective Assessment Of Cervical Vertebral Bone Age. Prog Orthod [Internet]. 2020 Oct 12;21(1):38. Available From: Http://Dx.Doi.Org/10.1186/S40510-020-00338-0

57. Vijayashree Priyadharsini J, Smiline Girija As, Paramasivam A. In Silico Analysis Of Virulence Genes In An Emerging Dental Pathogen A. Baumannii And Related Species. Arch Oral Biol [Internet]. 2018 Oct;94:93–8. Available From: Http://Dx.Doi.Org/10.1016/J.Archoralbio.2018.07.001

58. Khalid W, Vargheese Ss, Lakshmanan R, Sankari M, Jayakumar Nd. Role Of Endothelin-1 In Periodontal Diseases: A Structured Review. Indian J Dent Res [Internet]. 2016 May;27(3):323–33. Available From:

Http://Dx.Doi.Org/10.4103/0970-9290.186247

59. Kavarthapu A, Thamaraiselvan M. Assessing The Variation In Course And Position Of Inferior Alveolar Nerve Among South Indian Population: A Cone Beam Computed Tomographic Study. Indian J Dent Res [Internet]. 2018 Jul;29(4):405–9. Available From: Http://Dx.Doi.Org/10.4103/Ijdr.Ijdr_418_17

60. Thamaraiselvan M, Elavarasu S, Thangakumaran S, Gadagi Js, Arthie T. Comparative Clinical Evaluation Of Coronally Advanced Flap With Or Without Platelet Rich Fibrin Membrane In The Treatment Of Isolated Gingival Recession. J Indian Soc Periodontol [Internet]. 2015 Jan;19(1):66–71. Available From: Http://Dx.Doi.Org/10.4103/0972-124x.145790

61. Avinash K, Malaippan S, Dooraiswamy Jn. Methods Of Isolation And Characterization Of Stem Cells From Different Regions Of Oral Cavity Using Markers: A Systematic Review. Int J Stem Cells [Internet]. 2017 May 30;10(1):12–20. Available From: Http://Dx.Doi.Org/10.15283/Ijsc17010

62. Ramesh A, Ravi S, Kaarthikeyan G. Comprehensive Rehabilitation Using Dental Implants In Generalized Aggressive Periodontitis. J Indian Soc Periodontol [Internet]. 2017 Mar;21(2):160–3. Available From: Http://Dx.Doi.Org/10.4103/Jisp.Jisp_213_17

63. Ramesh A, Vellayappan R, Ravi S, Gurumoorthy K. Esthetic Lip Repositioning: A Cosmetic Approach For Correction Of Gummy Smile - A Case Series. J Indian Soc Periodontol [Internet]. 2019 May;23(3):290–4. Available From: Http://Dx.Doi.Org/10.4103/Jisp.Jisp_548_18

**Tables**

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| Dummett Index Score | Prevalence |
|---|---|
| Grade 0 (Pink ) | 23.5 % |
| Grade 1 (Light Brown) | 30.9% |
| Grade 2 (Medium Brown) | 27.5 % |
| Grade 3 ( Dark Brown / Blue) | 18.1% |

Table 1: Prevalence Of Various Dummett Indices Scores Of Gingival Hyperpigmentation And Percentage Of Participants Falling Into Each Group.

| | | | Skin Complexion | | Total |
|---|---|---|---|---|---|
| | | | Dark | Light | |
| Dummett Index | 0 | Count | $5_a$ | $30_b$ | 35 |
| | | Percent | 8.5% | 33.3% | 23.5% |
| | 1 | Count | $13_a$ | $33_a$ | 46 |
| | | Percent | 22.0% | 36.7% | 30.9% |
| | 2 | Count | $23_a$ | $18_b$ | 41 |
| | | Percent | 39.0% | 20.0% | 27.5% |
| | 3 | Count | $18_a$ | $9_b$ | 27 |
| | | Percent | 30.5% | 10.0% | 18.1% |

Table 2: Distribution Of Dummett Indices Over The Skin Complexion In The Study Population. 8.5% Of The Individuals In Grade 0 Have Dark Skin Complexion And 33.3% Have Light Skin Complexion Followed By 22% And 36.7% In Grade 1 , 39% And 20.9% In Grade 2 , 30.9% And 10% In Grade 3 Accordingly.($_{A,B}$ - Each Subscript Letter Denotes A Subset Of Skin Complexion Categories Whose Column Proportions Do Not Differ Significantly From Each Other At The .05 Level.) (Pearson Chi-Square Value: 24.786)

| | | | Age Group | | Total |
|---|---|---|---|---|---|
| | | | 17-18 Years Group | 19-20 Years Group | |
| Dummetindex | .00 | Count | $18_a$ | $17_b$ | 35 |
| | | % Within Age Group | 35.3% | 17.3% | 23.5% |
| | 1.00 | Count | $14_a$ | $32_a$ | 46 |
| | | % Within Age Group | 27.5% | 32.7% | 30.9% |
| | 2.00 | Count | $10_a$ | $31_a$ | 41 |
| | | % Within Age Group | 19.6% | 31.6% | 27.5% |
| | 3.00 | Count | $9_a$ | $18_a$ | 27 |
| | | % Within Age Group | 17.6% | 18.4% | 18.1% |
| Total | | Count | 51 | 98 | 149 |

| | | | | |
|---|---|---|---|---|
| | % Within Age Group | 100.0% | 100.0% | 100.0% |

Table 3: Comparison Of Mean Age Groups In The Various Dummett Indices Group. $_{A,B}$ - Each Subscript Letter Denotes A Subset Of Age Group Categories Whose Column Proportions Do Not Differ Significantly From Each Other At The .05 Level. (Pearson Chi-Square Value: 6.666)

**Figures**

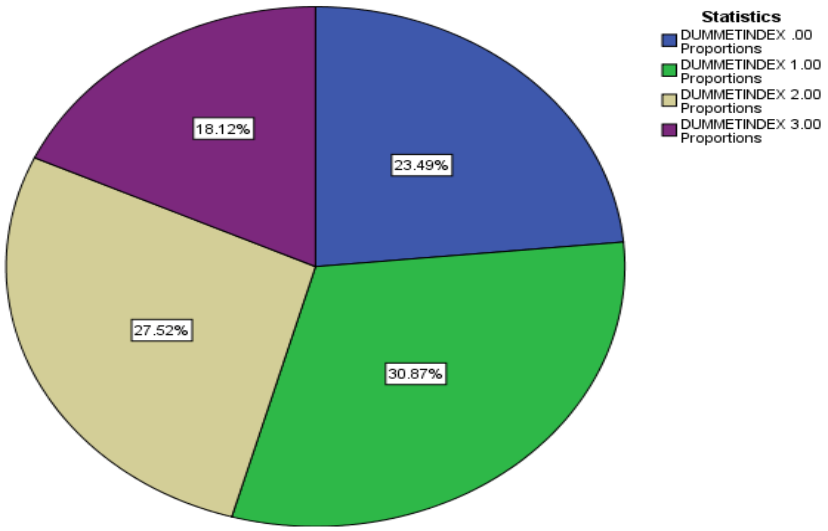


Figure 1: Pie Diagram Showing The Percentage Of Individuals Falling Into Each Group According To The Dummett Index. Where Dummett Index Grade 0 (Blue) Which Includes 23.49% Followed By Dummett Index Grade 1 (Green) Which Includes 30.67% , Dummett Index Grade 2 (Yellow) Which Includes 27.52% And Dummett Index Grade 3 (Magenta) Which Includes 18.12% Of The Individuals.

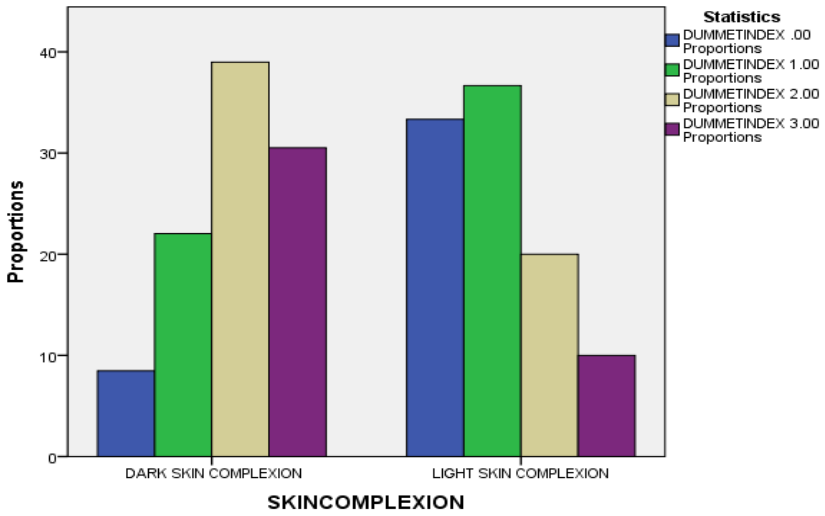


Figure 2: Bar Chart Comparing The Distribution Of Dummett Index Values Across The Skin Complexions (Dark & Light) In The Selected Study Population Which Is Represented On The X Axis.
Distribution Of Cases Under The Dummett Index 0 (Blue); Distribution Of Cases Under The Dummett Index 1 (Green) ; Distribution Of Cases Under The Dummett Index 2 (Yellow); Distribution Of Cases Under The Dummett Index 3 (Magenta). Y Axis Represents The Proportion Of Cases Under Each Group. Dark Skin Complexion Group Had More Proportion Of Cases Belonging To Grade 2 And 3 Dummett Indices Where White Skin Complexion Group Had More Proportions Of Cases Belonging To Grade 0 And 1 Dummett Index. Dark Skin Complexion Had More Darker Pigmentation Compared With The Light Skin Complexion. But The Subsets Of Skin Complexion Categories And Their Proportions Do Not Differ Significantly From Each Other At The .05 Level (Pearson Chi-Square: 24.786)

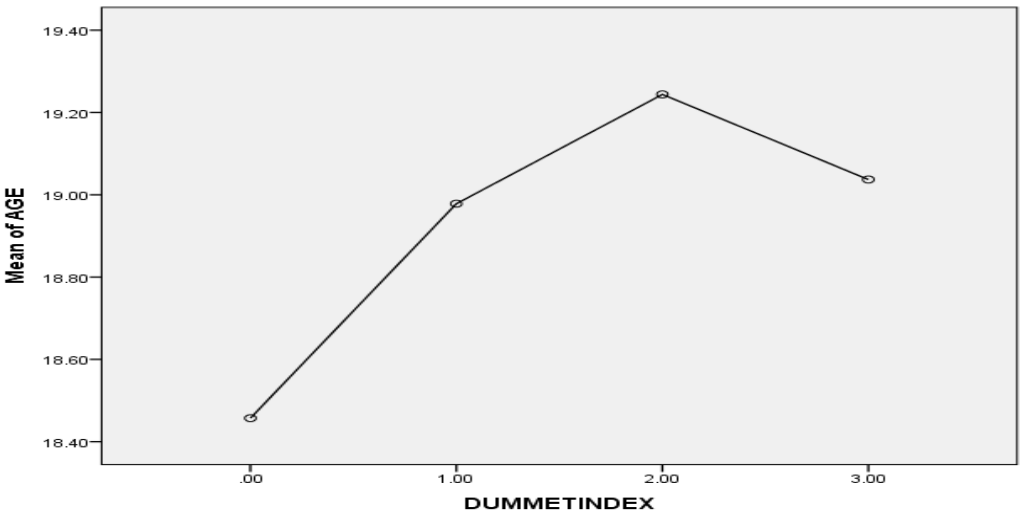


Figure 3: Mean Age Plot Distribution Of Dummett Indices In The Study Population. The X Axis Represents The Dummett Index Scores. The Y Axis Represents The Mean Age Of The Individuals Under The Different Dummett

Index Scores. The Dummett Indices Score Did Not Differ With The Age Of The Study Population Could Be Inferred. (Anova Test F Value: 7.395; P Value: 0.083)