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RESEARCH ARTICLE

A GLIMMER OF HOPE, THE NON-SURGICAL WAND FOR THE AESTHETIC CORRECTION OF BLACK TRIANGLES - A CASE SERIES

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Abstract

Gingival black triangles present as un-aesthetic embrasure spaces associated with papillary deficiency. With the psycho-social impact of the compromised aesthetics and the desire for appealing smile profile its management becomes the need of the hour. The Non-surgical treatment modalities of the papillary fill were evaluated owing to the scepticism of the patients towards the invasive surgical options for the aesthetic correction owing to associated co-morbidities and time constrains. The Hyaluronic acid fillers emerged as the most efficient and viable option. However, i-PRF demonstrated potential as a promising autologous and cost efficient alternate.

Introduction:-

Gingival aesthetics is deemed as a dominant factor in successful dental care and aesthetics. Gingival black triangles are designated as the third most abominateaesthetic concern below caries and apparent crown margins.[1]These are cosmetic deformities that present as an absence or deficiency of papilla resulting in black spaces or open embrasuresimpairingaesthetic features, phonetics, and are associated with complications of food accumulation.[2] The interdental papillae exhibit significant importance from an aesthetic perspective, especially in the anterior region since it is universally displayed during smiling.[3]

The management of gingival black triangles varies over a range of invasive treatment protocols, however the patients often have reservations opting for surgical interventions for the aesthetic corrections due to associated co-morbidities,also the meagre blood supply in interdental papilla is one of the major concerns when opting for invasive interventions.The low blood supply to interdental papillae makes them very delicate, fragile and sensitive to recession[4] and this renders the invasive aesthetic correction of papillary deficiency unpredictable.

Literature, talks about various non-surgicaltreatment protocols for the correction of black triangles that includes injectable platelet rich fibrin, botulinum toxin type A and Hyaluronic acid fillers. The Injectable Platelet rich fibrin(i-PRF) is rich in transforming growth factor-β, fibroblast growth factor, platelet derived growth factors and insulin like growth factorsthat may enhance papillary fill.Meanwhile,Botox is said to plumpup the papilla.[5]Hyaluronic acid on the other hand exhibits hygroscopic properties, regulates osmotic pressure and enhances tissue lubrication and resiliency.[6]Hyaluronic acid is a component of the extracellular matrix of periodontal tissues and is associated with tissue repair and wound healing by stimulation of cell proliferation, migration and interaction with growth factors.

The present series of cases aims to evaluate the efficacy of various non-surgical treatment options that may contribute to the re-establishment of gingival aesthetics by correction of papillary deficiency.

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Case Reports

The pilot study comprised of total six patients who visited the outpatient section of the Department of Periodontology at ITS-CDSR, Muradnagar, Ghaziabad, Uttar Pradesh, India withage ranging from 18-40 year.The patients had a chief complaint of unesthetic smile profile and papillary deficit.

Patients with Papilla Presence Index 2 (PPI 2) and Papilla Presence Index 3 (PPI 3) (Cardaropoli et al,2004), with good general health, without any history of systemic disease or under medication were included for the study. A total of 24 sites with papillary deficit were treated under different non-surgical treatment modalities. The deficit was denoted as embrasure space and was evaluated at baseline and at one month post treatment as the distance between the contact point and tip of the papilla. Each protocol comprised of 8 deficit sites. Smokers were excluded from the study.

Case 1

A 21-yearold female presented with complaint of food lodgement between anterior teeth. On examination, papillary deficiency was observed in the anterior aesthetic zone. Addressing the patient's concerns non-surgical protocol of i-prf injections was planned.Ultrasonic scaling was done and patient was recalled for the aesthetic correction after one month.On the day of procedure 10 ml of patient's blood was obtained and centrifuged at 700 rpm for 3 mins, for i-PRFpreparation. Local infiltrate was given prior to the injections.Thei-PRF was thendeposited at a distance of 2-3 mm from the tip of the deficit papilla at all sites. No medications or mouth-rinses were prescribed to the patient. The papillary deficit sites were re-evaluated one month after the injections.

Pre-operative Post-operative i-PRF

Site	Embrasure space at baseline (in mm)	Embrasure space at 1-month (in mm)
11-21	1	0
31-41	2	1

Case 2

A 35-yearold male patient reported with the complaint of visible gaps between his teeth. On examination, papillary deficiency was observed in the anterior aesthetic zone in both the maxillary and mandibular arch. Ultrasonic scaling was performed and patient was recalled for the aesthetic correction. The baseline recordings were performed in a similar fashion. Botulinum toxin type A injections given at the sites of papillary deficit following Local anaesthetic infiltrate. The patient was re-evaluted one month after the injections.

Pre-operative Post-operative Botox

Site	Embrasure space at baseline (in mm)	Embrasure space at 1-month (in mm)
21-22	2	2
31-41	3	3
31-32	2	2
32-33	3	3

Case 3

A 26-year old female who underwent orthodontic treatment six months back reported to the department with aesthetic concerns over the black spaces created between her teeth following the orthodontic procedure. Aquaplus® fine Hyaluronic acid filler injections were used for the aesthetic correction. The baseline recordings were made and the filler was deposited at the site of papillary deficit following Local anaesthetic infiltrate. The patient was re-evaluated one month after the injections.

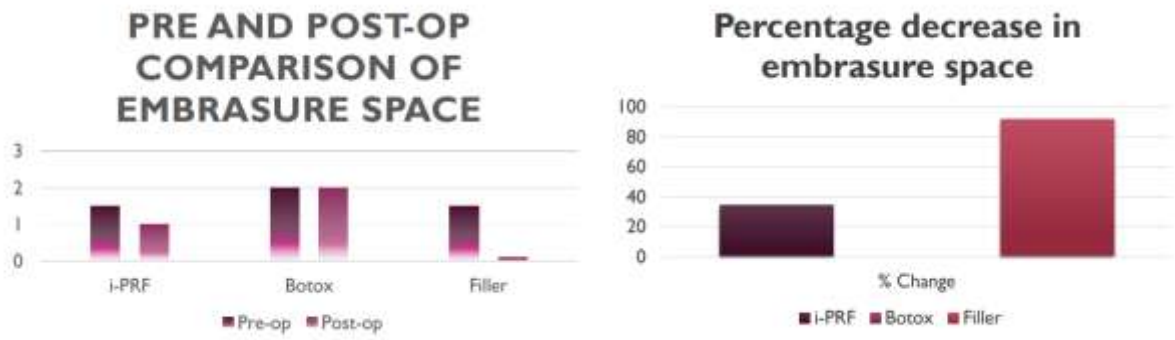
Pre-operative Post-operative Hyaluronic acid filler

Site	Embrasure space at baseline (in mm)	Embrasure space at 1-month (in mm)
31-41	1	0
31-32	2	0
41-42	2	0

Results:-

A total of 24 interdental papillae in six patients including 4 females and 2 males were evaluated. All participants were followed up for one month post intervention and no complications or hypersensitivity reactions were noted in either of the six patients enrolled for different non-surgical treatment modalities. In the i-PRF group the mean embrasure space measured from the contact point to the tip of the papilla decreased from a mean value of 1.5±0.46 to 1±0.59. In the botox group no change was observed and the mean value remained constant at 2±0.75. However,

the greatest reduction was observed in the Hyaluronic acid filler group with a change of mean values from 1.5±0.40 to 0.12±0.35. The percentagechange in embrasure space measured at baseline and one month post treatment is illustrated in the chart below.



Discussion:-

The series of cases aimed at evaluating the efficacy of different non-surgical treatment modalities in the aesthetic correction of papillary deficit. A decrease in the deficit was recorded in the injectable platelet rich fibrin group, the observations were in compliance with the study conducted by Trivedi et al.[7] They reported significant decrease in the PPI scores post i-PRF injections.

There was no change recorded in the PPI scores post intervention with the Botox injections which contradicts the report published by Chandra et al that states Botox plumps up the papilla and is the minimally invasive way to create proper and more pleasing gingival contours.[5]

The Hyaluronic acid filler shows significant improvements in papillary fills and emerges as the most viable and efficacious non-surgical treatment modality for the aesthetic correction of the black triangles.The results from the trial conducted byAbdelraouf et al[8] alsoillustrated theuse of hyaluronic acid fillers for the reconstruction of interdental papillary deficiency with promising levels of patients' satisfaction.

Amidst the various surgical treatment options available for Aesthetic correction of black triangles the minimally invasive non-surgical protocols including i-PRF and hyaluronic acid fillers injections can serve as a glimmer of hope for patients anxious about the surgical interventions and associated co-morbidities.

When compared on terms of availability and cost-effective parameters i-PRF can evolve as an alternative to Hyaluronic acid filler as it is an autologous option with no to minimal immune mediated adverse reactions.

Conclusion:-

The use of hyaluronic acid fillers for the treatment of interdental papillary deficiency was effective with higher levels of patient acceptance associated with immediately observable papillary fills. However, the improvements with i-PRF injections were progressive. This pilot study paves the way for series of future studies for determiniation of effective injection protocols in order to obtain better aesthetic outcomes. Also, long term studies with a larger sample size should be conducted to test the stability of results obtained.

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