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MANAGEMENT OF ORAL EPITHELIAL DYSPLASIA- A REVIEW

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ABSTRACT

Aim: *To review the management strategies for the treatment of oral epithelial dysplasia.*

Objective: *The purpose of this review is to analyse the effectiveness of success rate of the treatments given for oral epithelial dysplasia and the cure rate.*

Background*: Oral epithelial dysplasia is a relatively common premalignantcondition;oral dysplasia can only be diagnosed histologically. It is usually seen in the form of leukoplakia due to its non-scrapable white patches characteristic. It is a lesion that can progress into malignancy (cancer).*

Reason: *At present, the only effective treatment is surgical excision for oral epithelial dysplasia, but this method has high risk of recurrence. Surgical excision of large lesion may require extensive reconstruction technique. To avoid these disadvantages, a general dental practitioner should have more knowledge about the treatments for this lesion.*

Keywords: *oral dysplasia; premalignant condition; cryotherapy; surgical excision; leukoplakia.*

I. INTRODUCTION

Oral epithelial dysplasia is a relatively common premalignant condition, which affects approximately 2.5 to 5 per 1000 of population. It is usually seen by general medical and dental practitioners in the form ofleukoplakia (a white patch which is non-scrapable), which affects 1% to 2.5% of the population at any one time. Oral epithelial dysplasia can only be diagnosed histologically.[1]In oral epithelialdysplasia; cells of the normal oral epithelium are replaced by cells showing immature or inappropriate differentiation with a resemblance to cells usually seen in malignancy.(Fig:1)The importance of oral epithelia dysplasia lies in that a proportion of these lesions can progress to cancer. However, reports on the risk of progression to cancer vary considerably from 5% to 25%.[2]

The only effective treatment is surgical excision, and there are no effective medical treatments for oral epithelial dysplasia. Even surgical excision carries a high risk of recurrence (up to 35%).[3]Furthermore,

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resection of large lesions can cause significant morbidity and may sometimes require extensive reconstructive techniques.[4] Eliminating habituated condition which is the cause of the problem is appropriate but nowadays, medical science recommends using stem cell treatment. Relying on the new method, diagnosing and treating dysplastic lesions is promising even in high possibility of malignancy returning.[5]

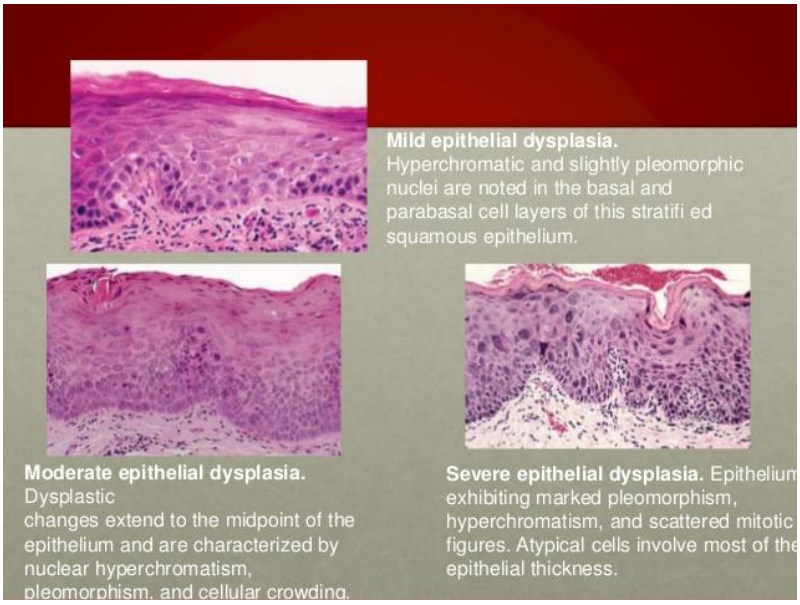

Fig: 1 - The histopathology of varies stages of epithelial dysplasia

II. SURGICAL INTERVENTION

In 2004, systemic review by Cochrane concludes that there is a complete lack of randomized controlled clinical trials that would allow to assess the effectivity of surgical treatment, including lasers, with regard to the prevention of future development of oral squamous cell carcinoma.Follow-up for patients who have undergone surgical excision of oral premalignant lesions is based in the known risk of recurrence or the appearance of new (primary) lesions.[6]

Conventional radical excision in the retro-mylohyoid region carries an elevated risk of injury to the lingual nerve that may result in permanent paraesthesia and loss of taste. Scar tissue formation may lower the quality of life by complicating the swallowing and agglutination functions of the tongue.[7]

Laser ablation/resection was recommended for the treatment of oral epithelial dysplasia to prevent transformation into malignancy, recurrence,and postoperative oral discomfort encountered by other conventional methods.[8] Laser is a, coherent, monochromatic, collimated and intense beam of light produced by stimulated emission of radiation of a light source. Based on active medium used such as gas, liquid, solid and semi-conductor, lasers are classified into different types and emitted lasers will have different properties based on the medium used. However, there is a higher degree of postoperative discomfort following laser ablation. The patient will report no postoperative pain following Laser ablation, although he did complain that the tissues felt “leathery” for approximately one week.[10]

III. CRYOTHERAPY

Cryotherapyis a method where lesional tissues are destroyed locally by freezing *in situ*. It is carried out either by an open or a closed system. Moreover, lesional tissues are destroyed through disruption of cell membrane, cellular dehydration, protein damage and enzyme, cell swelling and rupture, thermal shock injury to cells, damage to vasculature, and immune-mediated cytotoxicity.[11]Cryotherapy is frequently used as the therapy for oral lesions with promising results.(Fig:2) A combination of two therapies which is shave excision and cryotherapy is needed to achieve a complete regression of the lesion.Based on the present results, cryotherapy is a novel and effective approach to appropriate management of mild epithelial dysplasia.[12]

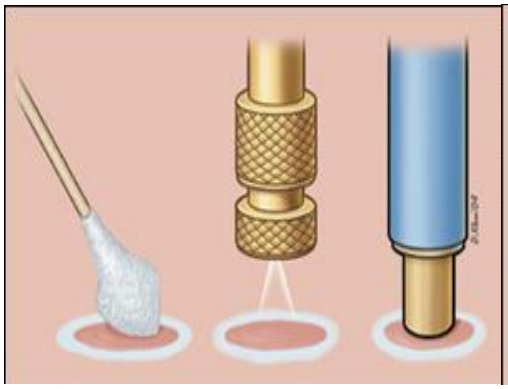

Fig: 2Cryotherapy devices.
***(Left)* Cotton-tip applicator. *(Center)* Liquid nitrogen spray.**
***(Right)* Cryoprobe.**

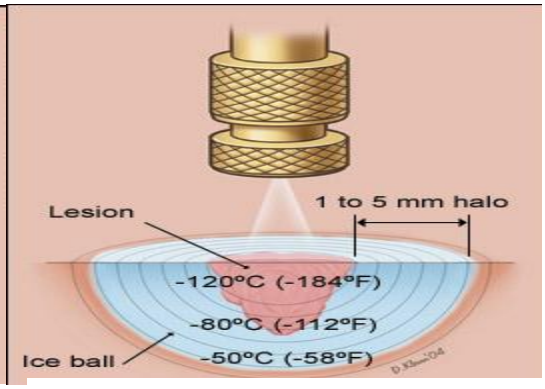

Fig:3 Timed spot freeze technique used to treat a malignancy (possibly a small basal cell cancer), demonstrating freeze ball formation and the 5-mm treatment margins necessary to achieve a temperature of 250°C (258 °F) and, thus, the required depth of 4 to 5 mm.

The mechanisms for cell destruction after cryotherapy are complex involving a combination of direct and indirect effects.(Fig:3) Direct effects consist of extracellular and intracellular formation of ice crystals, which in turn disrupt cell membranes, cellular dehydration, toxic intracellular electrolyte concentration, inhibition of enzymes, protein damage, thawing effects that cause the cell to vacuolated, swell, and rupture,[14]and thermal shock injury to cells.[15]Indirect effects are vascular changes that lead to ischemic necrosis of the treated tissue and immunological responses that cause cell damage through a cytotoxic immune mechanism.[17]

IV. NON-SURGICAL INTERVENTION

According to Cochrane, dysplasia resolution was defined as absence of dysplastic histo-morphologic features in the post intervention biopsy specimen. A comparison of the response to treatment or to placebo in the 3 selected studies demonstrated that dysplastic changes resolved in 31 (66%) of 47 intervention patients and in 6 (26%) of 23 placebo patients, respectively.An important caveat is the evidence of significant heterogeneity among the stratum-specific. Interventions with topical bleomycin, systemic cisretinoic acid, and systemic lycopene may help to resolve oral epithelial dysplastic lesions.[18] However, these methods should be added

with follow-ups for the patients.To date there is no evidence of effective nonsurgical treatment in preventing progression of dysplastic lesions to Squamous cell carcinoma.[20]

V. TISSUE ENGINEERED ORAL MUCOSA

The mucosa has gained the ability of producing normal keratins with maturity and function.Tissue engineering is defined as understanding the principles of tissue growth and applying this to produce functional replacement tissue for clinical use.[21]Tissue engineered in oral mucosa can replace soft tissue defects in the oral cavity.[22] Tissue engineering in oral mucosa comprises of two techniques; Partial-thickness engineered oral mucosa and full-thickness tissue engineered oral mucosa. Partial-thickness technique allows production of epithelial cells for replacing dysplastic oral mucosa. This technique uses one type of cell layer which can be in monolayer or multilayer.[23]

Monolayer epithelial cells makes use of the response to stimuli such as mechanical stress, growth factor addition and radiation damage. These multilayer epithelial cells show signs of differentiation such as the formation of a basement membrane and keratinization.[24]with the advancement of tissue engineering as an alternative approach, full-thickness tissue-engineered oral mucosa was developed.This technique is a better simulation of the in vivo situation as they take the anatomical structure of native oral mucosa into account.

The important prognosis of the full-thickness technique is to resemble the normal oral mucosa. To get best results, the subtype and origin of the fibroblasts and keratinocytes which is used in oral mucosa tissue engineering are important factors. Fibroblasts are generally taken from the dermis of skin or oral mucosa.Keratinocyte may isolates from different areas of the oral cavity such as the palate or gingiva. Time is an important parameter during the usage of fibroblasts and keratinocytes, since the functioning of these cells decreases with time. Cell that are been transplanted should adapt to their new environment and function correctly. Losing transplanted tissue is an important risk factor if cells do not adapt properly. Adaptation process goes more smoothly if the donor tissue cells resemble the cells of the native tissue.[25]

VI. CONCLUSION

Oral epithelial dysplasia carries a significant rate of transformation to cancer, which increases considerably for high-grade dysplasia. Surgical excision appears to decrease but does not eliminate the risk. These findings suggest the need for surgical excision and continued surveillance, especially for high-grade lesions. Some other management are also suggested such as laser ablation, cryotherapy, non-surgical invasive method with topical bleomycin, systemic cisretinoic acid, and systemic lycopene may help to resolve oral epithelial dysplastic lesions but these methods need follow-ups of the patients and it’s not as effective as surgical excision. Each and every single method obeys its adverse effect and has disadvantages which will be discomfort for the patient. A regular check-up for patient who underwent treatments is very important to avoid re-occurrence of oral epithelial dysplasia.

REFERENCES:

1. **Oliveira LR, Jeffrey SS, Ribeiro-Silva A.** Stem cells in oral cavity. Histol Histopathol. 2010; 25:371–85. PubMed PMID: 20054808. [PubMed]

2. **Pindborg JJ, Reichart P, Smith CJ, von der Waal I**. World Health Organization: histological typing of cancer and precancer of the oral mucosa. Berlin: Springer Verlag; 1997.

3. **Reibel J.** Prognosis of oral pre-malignant lesions: signifi- cance of clinical, histopathological, and molecular biological characteristics. Crit Rev Oral Biol Med 2003; 14:47– 62.

4. **Lodi G, Sardella A, Bez C, Demarosi F, Carrassi A**. Interventions for treating oral leukoplakia. Cochrane Database Syst Rev 2006

5. **Lodi G, Sardella A, Bez C, Demarosi F, Carrassi A.** Interventions for treating oral dysplasia. Cochrane Database Syst Rev 2004; (3)

6. **Jakobsen C, Sørensen JA, Kassem M, Thygesen TH.** Mesenchymal stem cells in oral reconstructive surgery: a systematic review of the literature. J Oral Rehabil. 2013; 40:693–706. doi: 10.1111/joor.12079. PubMed PMID: 23834336. [PubMed]

7. **Choi JH, Gimble JM, Lee K, Marra KG, Rubin JP, Yoo JJ, et al.** Adipose tissue engineering for soft tissue regeneration. Tissue Eng Part B Rev. 2010; 16:413–26. doi: 10.1089/ten.teb.2009.0544.PubMed PMID: 20166810; PubMed Central PMCID: PMC2946881. [PMC free article] [PubMed]

8. **Moharamzadeh K, Brook IM, Van Noort R, Scutt AM, Thornhill MH.** Tissue-engineered oral mucosa: a review of the scientific literature. J Dent Res. 2007; 86:115–24. doi: 10.1177/154405910708600203. PubMed PMID: 17251509. [PubMed]

9. **Alsberg E, Hill EE, Mooney DJ.** Craniofacial tissue engineering. Crit Rev Oral Biol Med. 2001; 12:64–75. doi: 10.1177/10454411010120010501. PubMed PMID: 11349963. [PubMed]

10. **Scheller EL, Krebsbach PH, Kohn DH**. Tissue engineering: state of the art in oral rehabilitation. J Oral Rehabil. 2009; 36:368–89. doi: 10.1111/j.1365-2842.2009.01939.x. PubMed PMID: 19228277; PubMed Central PMCID: PMC2744808. [PMC free article] [PubMed]

11. **Agha-Hosseini F, Moslemi E, Mirzaii-Dizgah I**. Comparative evaluation of low-level laser and CO(2) laser in treatment of patients with oral lichen planus. Int J Oral Maxillofac Surg. 2012; 41(10):1265–9.[PubMed]

12. **Fornaini C, Raybaud H, Augros C, Rocca JP.** New clinical approach for use of Er:YAG laser in the surgical treatment of oral lichen planus: a report of two cases. Photomed Laser Surg. 2012; 30(4):234–8.[PubMed]

13. **de Magalhaes-Junior EB, Aciole GT, Santos NR, dos Santos JN, Pinheiro AL**. Removal of oral lichen planus by CO_2 laser . Braz Dent J. 2011; 22(6):522–6. [PubMed]

14. **Hegde R, Padhye A, Sumanth S, Jain AS, Thukral N.** Comparison of surgical stripping; erbium-doped:yttrium, aluminum, and garnet laser; and carbon dioxide laser techniques for gingival depigmentation: a clinical and histologic study. J Periodontal. 2013; 84(6):738–48. [PubMed]

15. **Simsek Kaya G, Yapici Yavuz G, Sumbullu MA, Dayi E.** A comparison of diode laser and Er:YAG lasers in the treatment of gingival melanin pigmentation. Oral Surg Oral Med Oral Pathol Oral Radiol. 2012; 113(3):293–9. [PubMed]

16. **Baeder FM, Pelino JE, de Almeida ER, Duarte DA, Santos MT.** High-power diode laser use on Fordyce granule excision: a case report. J Cosmet Dermatol. 2010 Dec; 9(4):321–4. [PubMed]

17. **Jerjes W, Upile T, Hamdoon Z, Al-Khawalde M, Morcos M, Mosse CA. et al.** CO_2 laser of oral dysplasia: clinicopathological features of recurrence and malignant transformation. Lasers Med Sci. 2012; 27(1):169–79. [PubMed]

18. **Deppe H, Mucke T, Hohlweg-Majert B, Hauck W, Wagenpfeil S, Holzle F**. Different CO_2 laser vaporization protocols for the therapy of oral precancerous lesions and precancerous conditions: a 10-year follow-up. Lasers Med Sci. 2012; 27(1):59–63. [PubMed]

19. **Luna-Ortiz K, Campos-Ramos E, Pasche P, Mosqueda-Taylor** A. Oral mucosal melanoma: conservative treatment including laser surgery. Med Oral Patol Oral Cir Bucal. 2011; 16(3):e381–5. [PubMed]

20. **Lopez-Jornet P, Camacho-Alonso F.** Comparison of pain and swelling after removal of oral leukoplakia with CO (2) laser and cold knife: a randomized clinical trial. Med Oral Patol Oral Cir Bucal. 2013; 18(1):e38–44. [PMC free article] [PubMed]

21. **Fornaini C, Rocca JP, Merigo E, Meleti M, Manfredi M, Nammour S. et al.** Low energy KTP laser in oral soft tissue surgery: A 52 patients clinical study. Med Oral Patol Oral Cir Bucal. 2012; 17(2):e287–91.[PMC free article] [PubMed]

22. **Boj JR, Poirier C, Espasa E, Hernandez M, Espanya A.** Lower lip mucocele treated with an erbium laser. Pediatr Dent. 2009; 31(3):249–52. [PubMed]

23. **Yague-Garcia J, Espana-Tost AJ, Berini-Aytes L, Gay-Escoda C.** Treatment of oral mucocele-scalpel versus CO_2 laser . Med Oral Patol Oral Cir Bucal. 2009; 14(9):e469–74. [PubMed]

24. **Lai JB, Poon CY.** Treatment of ranula using carbon dioxide laser--case series report. Int J Oral Maxillofac Surg. 2009; 38(10):1107–11. [PubMed]

25. **Lindenmuller IH, Noll P, Mameghani T, Walter C.** CO_2 laser-assisted treatment of a giant pyogenic granuloma of the gingiva . Int J Dent Hyg. 2010;8(3):249–52. [PubMed]