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Evaluation of the method of gingivectomy done in endodontically treated teeth

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Abstract: Gingivectomy is done to correct gingival levels , esthetic contour and adequate crown length which is required. Gingivectomy is a type of clinical crown lengthening. The tooth requiring endodontic treatment requires Clinical crown lengthening procedure because of overgrowth of gingiva. Gingivectomy can either be done using a scalpel or laser depending on the procedure. The study aims at evaluating the gingivectomy method done in endodontically treated teeth. The details of patients requiring CLP/gingivectomy prior to RCT were collected.72 patients required the procedure. The details of these patients were collected and reviewed. Excel tabulation was done, results and graphs were obtained from SPSS. Statistical test performed was the Chi square test. 52.76% of the total underwent laser gingivectomy whereas 47.22% of them underwent laser gingivectomy. Chi square test shows $p>0.05$, non significant association. Thus it was found that the patients requiring gingivectomy prior to endodontic treatment had mostly undergone laser gingivectomy than surgical gingivectomy.

Keywords: Endodontic treatment; Laser; RCT; Surgical gingivectomy

INTRODUCTION

The crown lengthening procedure is a routinely carried out procedure to correct gingival levels and to obtain esthetic contours and adequate crown length for restorative purpose (Kulkarni *et al.*, 2016). The exposure of the tooth surface by apically displacing gingival tissue and the bone margins facilitates placement of restorative margins (Palomo and Kopczyk, 1978),(Deas *et al.*, 2004). Most commonly, gingival overgrowth is a plaque-induced inflammatory process, which can be modified by systemic conditions or medications. A rare genetic condition can result in gingival overgrowth with non-plaque-induced aetiology sometimes. The differential diagnoses of other presentations of enlarged gingival tissues such as secondary to localised trauma or non-plaque-induced inflammation may be manifestations of more severe conditions (Beaumont *et al.*, 2017) . Biological width of 2-3mm to be maintained to ensure health of periodontal tissue (Oakley *et al.*, 1999),(Gargiulo, Wentz and Orban, 1961). For proper treatment of the tooth in all cases rubber dam isolation is very essential. In certain cases the caries go too deep making the isolation more or less very difficult (Congiusta and Veitz-Keenan, 2016).

Endodontically treated teeth in some cases require a crown lengthening procedure as to prevent injury in the teeth due to structurally inadequate crown or exposing tooth structure in the presence of deep,subgingival pathologies that may hamper the access for proper restorative measure (Ganji, Patil and John, 2012). A Dentist should always balance the esthetical needs and restorative needs with the periodontal health (Shobha *et al.*, 2010). The Crown lengthening procedure for a tooth can be done either by a gingivectomy procedure, apically displaced flap or by surgical extraction of the tooth (Nethravathy, Vinoth and Thomas, 2013)-(Bensimon, 1999). The selection of the technique depends on the patient related factors like esthetics,crown root ratio,root proximity, root morphology, tooth position and availability to restore teeth. Two types of gingivectomy is said to be widely performed-The surgical gingivectomy[uses Kirkland knife or Bard-Parkers blades no.11,12] or laser gingivectomy [CO2 laser,Nd-YAG laser]. The other types are gingivectomy by cryosurgery,by chemosurgery,by electrosurgery (Davarpanah *et al.*, 1998).

Crown lengthening procedure can be just the removal of soft tissue or orthodontic extrusion followed by flap with osseous surgery on a tooth requiring endodontic therapy. Total treatment could thus might involve endodontic, orthodontic, periodontic and restorative procedures. Careful evaluation, treatment planning and

treatment following the principles can achieve results that meet the functional and esthetic challenges in the current scenario [(Allen, 1993; Congiusta and Veitz-Keenan, 2016).Our team has rich experience in research and we have collaborated with numerous authors over various topics in the past decade (Deogade, Gupta and Ariga, 2018; Ezhilarasan, 2018; Ezhilarasan, Sokal and Najimi, 2018; Jeevanandan and Govindaraju, 2018; J *et al.*, 2018; Menon *et al.*, 2018; Prabakar *et al.*, 2018; Rajeshkumar *et al.*, 2018, 2019; Vishnu Prasad *et al.*, 2018; Wahab *et al.*, 2018; Dua *et al.*, 2019; Duraisamy *et al.*, 2019; Ezhilarasan, Apoorva and Ashok Vardhan, 2019; Gheena and Ezhilarasan, 2019; Malli Sureshbabu *et al.*, 2019; Mehta *et al.*, 2019; Panchal, Jeevanandan and Subramanian, 2019; Rajendran *et al.*, 2019; Ramakrishnan, Dhanalakshmi and Subramanian, 2019; Sharma *et al.*, 2019; Varghese, Ramesh and Veeraiyan, 2019; Gomathi *et al.*, 2020; Samuel, Acharya and Rao, 2020)
The aim of the present study was to evaluate the type of gingivectomy done in a tooth requiring endodontic treatment.

MATERIALS AND METHOD

A retrospective study of sample size 72 patients were conducted.The patients had reported to Saveetha Dental College,Chennai.The study was conducted in a university set up. The population selection was random.The patient records were reviewed and analysed between June 2019 and March 2020. Patients who reported to the institution who required gingivectomy prior to Root canal treatment were noted. Cross verification by data was done with the help of case sheets and photographs. All available data was included to minimise sampling bias and incomplete and censored data was excluded. Excel tabulation of the data was done.

Statistical analysis

After Excel tabulation,the data was transferred to SPSS. The analysis was done using SPSS version 19. Descriptive statistics were used to correlate between the gingivectomy procedures.The dependent variables were the type of gingivectomy procedure performed and independent variables were age and gender. The data was imported to SPSS. The statistical test performed was the chi square test. The type of analysis performed was correlation and association. The level of significance was set at 0.05.

Ethical approval

Ethical approval was obtained for the retrospective study from Saveetha Research Board [SRB]. Ethical approval no. SDC/SIHEC/2020/DIASDATA/0619-0320.

RESULTS AND DISCUSSION

Out of 72 patients it was seen that 52.76% of them i.e, 38 patients had been performed a laser gingivectomy and 47.22% of them had undergone surgical gingivectomy (Figure 1). 52.78% of the total have undergone gingivectomy in the mandibular posteriors followed by 36.11% of them in the maxillary posteriors and 11.11% in the maxillary anteriors (Figure 2). It is seen that more number of Mandibular posteriors have undergone surgical gingivectomy (31.94%) followed by 12.5% of Maxillary posteriors and 2.78% of maxillary anteriors and Maxillary posteriors have undergone more laser gingivectomy procedure (23.61%) followed by 20.82% of mandibular posteriors and 8.33% of maxillary anteriors. Chi square test shows p value=0.051 ($p>0.05$), non significant association (Figure 3). It is seen that more number males (27.78%) had undergone surgical gingivectomy than females (19.44%) and an equal number of males and females (26.39%) had undergone laser gingivectomy. Chi square test shows p value= 0.453 ($p>0.05$), non significant association (Figure 4).
It was seen that 52.76% of the patients had undergone laser gingivectomy whereas 47.22% of them had undergone surgical gingivectomy. Qualitative and quantitative changes in gingiva is of therapeutic significance (Varghese *et al.*, 2015). Understanding of periodontal diseases has evolved over the years and is transformed from periodontitis being considered a ubiquitous condition (Gajendran, Parthasarathy and Tadepalli, 2018). Gingival enlargement might be sometimes seen in cases of periodontitis, that many require Crown lengthening procedure. Periodontitis are severe debilitating disorders of inflammatory origin [(Ramesh, Sheeja S. Varghese, *et al.*, 2016). The chronic inflammatory state of periodontal destruction is caused by multiple etiology and risk factors (Priyanka *et al.*, 2017). Periodontitis is defined as a chronic inflammatory condition which is initiated by gram-negative organisms present in the supporting structures (Mootha *et al.*, 2016). Periodontal regeneration is defined as complete restoration of lost periodontal tissues back to its original architecture and function. A variety of treatment modalities are being proposed to achieve it (Ravi *et al.*, 2017). Periodontitis is generally characterized by elevated levels of various cytokines and inflammatory mediators (Khalid *et al.*, 2017). Studies have identified Endothelin-1 in gingival tissues obtained from patients affected by chronic periodontitis or by gingival overgrowth. Thus highlighting that there is a need to appraise the role of Endothelin-1 in periodontal disease (Khalid *et al.*, 2016). Generalized aggressive periodontitis [GAP] is a debilitating form of the disease and it results in deteriorating effects on the esthetic and functional aspects of the oral cavity (Ramesh, Ravi and Kaarthikeyan, 2017).

The laser technique is widely used as it is said to be easier and quicker.Relatively lower bleeding was seen in lasers and also laser gingivectomy needed less Local Anesthesia (Pourzarandian *et al.*, 2005). Trauma to the inferior alveolar nerve [IAN] is one of the complications during surgical procedures in the mandibular posterior [(Kavarthapu and Thamaraiselvan, 2018). It was also seen that in case of laser,there was less postoperative pain and the heat generated by laser inhibited the pain receptors and coagulation which provided a dry and isolated environment.The wounds were also less infected (Haraji and Rakhshan, 2015),(D'Arcangelo *et al.*, 2007) or rather it was found to be healing fast. Further studies can be done which aim at determining whether the addition of an autologous platelet rich fibrin [PRF] membrane to a coronally advanced flap [CAF] would improve the outcome in terms of root coverage in the case of treatment of isolated gingival recession (Thamaraiselvan *et al.*, 2015). Gummy smile has always found to have a negative effect on the esthetical view of younger individuals (Ramesh *et al.*, 2019).

The most preferred method of CLP is said to be gingivectomy (Gupta *et al.*, 2015) as the procedure is less time consuming,gives effective long term results and is less invasive. Studies also show that,non surgical procedures are less effective in controlling gingival inflammation than surgical or laser gingivectomy (Lione *et al.*, 2019). The herbal medicines have shown to possess a wide array of biological properties such as antimicrobial, antioxidant, and anti-inflammatory effects. The procedure is said to be essential if required as the equigingival margins of restorations in all cases ensure that there is no irritation to the supra alveolar tissue from restorations tissue levels remain stable (Ramesh, Sheeja Saji Varghese, *et al.*, 2016). Newer inventions just like the laser uses have been found that show that there is no standard protocol existing in isolating the stem cells from different sources of oral cavity (Avinash, Malaippan and Dooraiswamy, 2017). Various controlled clinical trials have demonstrated that some of the available grafting procedures may result in periodontal regeneration in intrabony defects, but complete and predictable reconstruction of periodontal tissues is still difficult to obtain (Panda *et al.*, 2014).Our institution is passionate about high quality evidence based research and has excelled in various fields ((Pc, Marimuthu and Devadoss, 2018; Ramesh *et al.*, 2018; Ezhilarasan, Apoorva and Ashok Vardhan, 2019; Ramadurai *et al.*, 2019; Sridharan *et al.*, 2019; Vijayashree Priyadharsini, 2019; Mathew *et al.*, 2020)

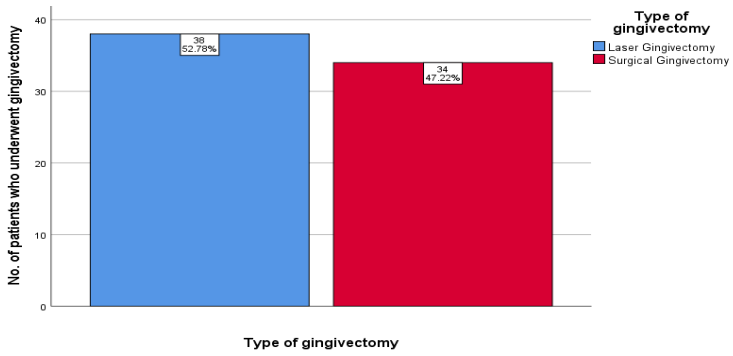

Fig.1: Bar graph shows distribution of endodontic treated tooth requiring surgical or laser gingivectomy. X axis denotes the type of gingivectomy and Y axis denotes the number of patients who had undergone laser or surgical gingivectomy. More number of laser gingivectomy (blue) procedures were performed than surgical gingivectomy (red).

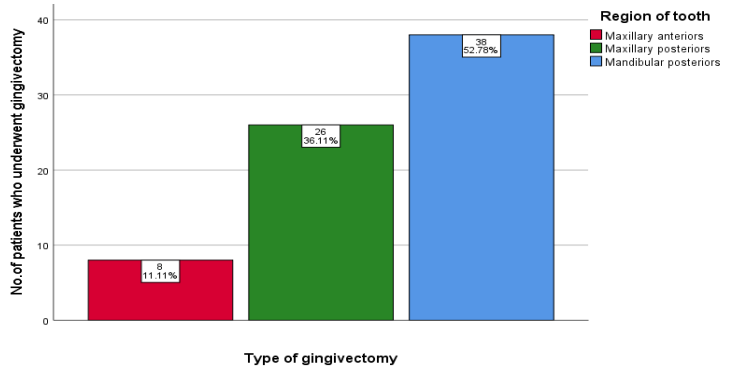

Fig.2: Bar graph shows distribution of the region of the tooth which underwent gingivectomy. X axis denotes the region of tooth and Y axis denotes the number of patients who had undergone laser or surgical gingivectomy. Maximum patients had undergone gingivectomy in the mandibular posterior region (blue) followed by maxillary posteriors (green) and maxillary anteriors (red).

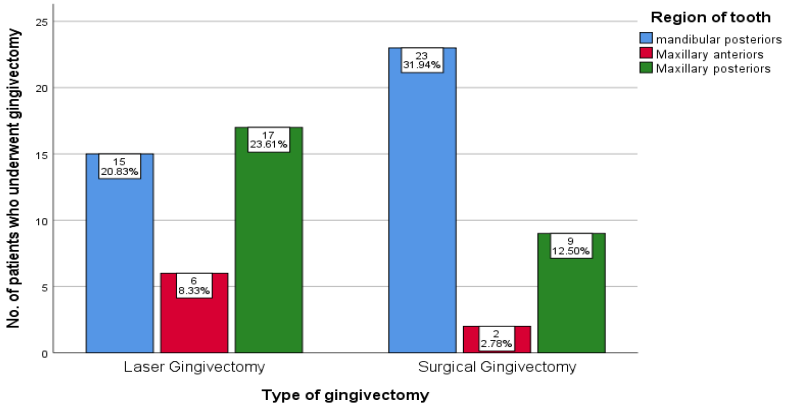

Fig.3: Bar graph shows association between regions of tooth and tooth requiring surgical/ laser gingivectomy. X axis denotes the type of gingivectomy and Y axis denotes the number of patients who had undergone laser or surgical gingivectomy. Mandibular posteriors (blue) had mostly undergone surgical gingivectomy and maxillary posteriors (green) had mostly undergone laser gingivectomy procedures than maxillary anteriors (red). However, this is statistically not significant , chi square test shows p value= 0.051, proving that there is no significant association between the region of tooth and type of gingivectomy.

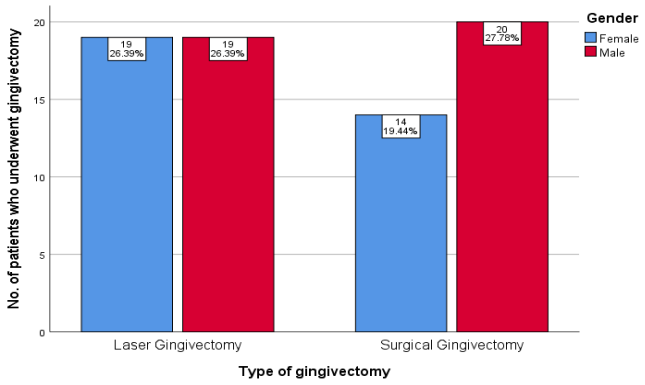

Fig.4: Bar graph shows association between gender and tooth requiring surgical/ laser gingivectomy. X axis denotes the type of gingivectomy and Y axis denotes the number of patients who had undergone laser or surgical gingivectomy. It is seen that more males (red) had undergone surgical gingivectomy than females (blue) and an equal number of males and females had undergone laser gingivectomy. However, this is statistically not significant, chi square test shows p value= 0.453, proving that there is no significant association between the gender and type of gingivectomy.

Limitations

The limitations of the study include that the study has been conducted in a different ethnicity and also the study could be conducted only on patients requiring endodontic treatment.

CONCLUSION

Within the limitation of the study it was seen that most of the patients underwent laser gingivectomy than a surgical gingivectomy. The study can further aim at determining success rates of root canal treatments and for the ease of treatment planning.

AUTHOR CONTRIBUTIONS

Preethi Mariona carried out the retrospective study, planning the study design, collection and analysis of data and drafted the manuscript. Dr. Nashra Kareem and Dr. Sree Devi aided in conception of the topic, supervision and appraisal of the manuscript.

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