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INTERPROXIMAL REDUCTION IN ORTHODONTICS-A REVIEW

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ABSTRACT:
Orthodontic treatment usually requires space, aiding in tooth alignment .There are various methods to obtain this which includes extraction, mesio distal dimension reduction, distalization ,de rotation of posteriors, and up righting molars. Among these mesio distal enamel reduction is considered a common and successful treatment option of gaining space in mild cases. This review article gives an over view of interproximal method of space gaining.

KEYWORD: Interproximal reduction, method of space gaining, IPR, IER

1. INTRODUCTION:

Interproximal reduction is a clinical procedure involving the reduction, anatomic recontouring, and protection of proximal enamel surfaces of permanent teeth. (Peck and peck 1972) Synonymously this procedure can be called as slicing, Hollywood trim, selective grinding, mesiodistal reduction, reapproximating, interproximal wear, and coronoplasty. Interproximal reduction is one of the 6 keys to eliminating lower retention by Raleigh Williams.[1]

The use of this procedure has increased in recent years by orthodontists With the desire to treat variety of malocclusions with less of extractions slicing provide space to correct malocclusions. Interproximal reduction has also been used in retreatment orthontic patients and to also stabilise the post orthodontic results. The review paper gives an overview of this commonly practised method of space gaining.

2. HISTORY:

In 1944, Ballard in order to correct the disharmony between the mandibular lower anterior advised slicing the mesiodistal width of anteriors . [2]

A few years later, Hudson in 1956 described in detail a stripping technique utilizing metallic strips, followed by polishing and fluoride preventive measures.[3]Peck and Peck observed that well aligned mandibular incisors have significantly lower mesiodistal/ labiolingual indices than those of crowded incisors, and

recommended stripping for addressing tooth shape deviation[4] in 1980's Sheridan, in order to avoid extraction and expansion gave grinding of interproximal surface of anterior as an alternative.[5],[6]. Zachrisson recommended enamel reshaping to improve anterior esthetics, i.e. to prevent or reduce interdental gingival retraction (black triangles) that becomes evident after alignment of crowded anterior segments[7]

3. PURPOSE IN ORTHODONTICS:

Increase amount of available space to eliminate tooth crowding, facilitate tooth movement and alignment and Effectively increase leeway space to allow eruption of permanent premolars (IPR distal of lower canines)

4. INDICATION:

TOOTH SIZE DISCREPANCIES: Bellard in 1944 found a left-right tooth discrepancy in one or more pairs of teeth, in his study of 500 cases. These discrepancies if not corrected could be responsible for rotations and slipped contacts. He advocated careful stripping of proximal stripping of anterior teeth. 10

INTER ARCH DISCREPANCIES: Kesling in 1945 stresses the importance of favorable interarch tooth size relationship for the establishment of stable occlusion.

TOOTH SHAPE AND DENTAL ESTHETICS: Stripping can and should be used for the reshaping of the enamel on some teeth, thus contributing to an improved finishing of orthodontic treatment and dental esthetics. Peck and Peck in 1972 indicate that a substantial relationship exists between mandibular incisor shape and the presence and absence of mandibular incisor crowding[4]
CROWDING OF MANDIBULAR INCISORS: stripping was first used to obtain space for correction and prevention of crowding by reducing their mesiodistal width.[3]

TO ENHANCE RETENTION AND STABILITY: In cases where there are tooth material- arch length discrepancies not only is it necessary to reduce these discrepancies so that the teeth are aligned properly but also so that the teeth will remain stable after orthodontic therapy and retention has been completed
Normalization of gingival contour and elimination of triangular spaces above the papilla thus greatly improving esthetic and smile and to reduce expansion and premolar extraction.

CURVE OF SPEE CORRECTION: I t is necessary to create a few millimeters of space in the arch.

5. CONTRAINDICATION:

1.Severe crowding
2.Poor oral hygiene and poor oral environment
3.Small teeth which exhibit hypersensitivity
4.Suceptibility to decay.
5.Multiple restorations.

6. ADVANTAGES OF INTERPROXIMAL REDUCTION:

Various advantages of interproximal reduction include increased available space in the mandibular anterior area , it provides broader contact point areas and thereby greater contact stability, Prevent or reduce interdental gingival retraction (reduce the appearance of black triangles)IPR maintain or improve gingival papillae . There is no major changes in arch shape anticipated sometimes it even reduced treatment time

7. DISADVANTAGES:

TREATMENT PLANNING:

Study cast measurements can determine the required amount of correction.11Ideally, a diagnostic set-up will supplement treatment planning and visualize the final position and morphology of teeth. The use of calibrated radiographic images to determine the exact amount of enamel that can be removed, though recommended by various authors, might not be feasible for routine clinical application.

Placement of fixed appliances and correction of rotations are recommended prior to stripping. 12An initial phase of levelling and aligning will establish proper contact points. Visibility and mechanical access to the proximal surfaces will be further improved by means of a coil spring, separator, or wooden wedge.

8. MATERIALS AND METHOD:

Interproximalenmael reduction involves four stages which includes

1.Reduction

2.Shaping

3.Polishing

4.Protection of enamel

Manual or mechanical methods can be used for inter enamel reduction. Strips impregnated with metal oxides and abrasives, metallic strips with devices to easily handle them are used in the manual inter enamel reduction. This method was first described in the literature by Hudson.[3]

It is time-consuming, There is a technical difficulty in working on posterior teeth and It causes much deeper grooves on the abraded enamel than those caused by mechanical instrumentation. To overcome these difficulties mechanical methods came into play. Mechanical technique greatly reduces working time. The reduction in time is due to the handpieces to which the strip with the holder/discs attached .The disadvantage of using contra-angles and high-speed handpieces are they need good clinical training in be done on patients without flaw.

Mesiodistal enamel reduction is performed by either manual or mechanical methods.The manual method of IPR is considered time consuming and they are complained to be very difficult to be used in the posterior regions, there manual hand-operated strips are reserved for minor enamel removal cases and as either finishing or introduction procedure.

In an update of the ARS technique, Chudasama and Sheridan suggested the use of a safe-tipped ARS bur to reduce interproximal enamel and prevent scarring of the proximal walls.[13].Recently the popularity has shifted towards diamond discs ,segmented discs or metallic strips which can be adapted to a shuttle head .Segment disc systems enhance further visual and geometric access in relation to full 360° discs

In order to prevent the adjacent tooth not to be slendered which are fitted over the handpieces are used. Small enamel amounts should be ground symmetrically from all contact areas before maximum acceptable removal per site is reached. Recently there are commercially available leag gauges to check the progess and quantify the amount of slenderization done.

9. FINISHING AND POLISHING OF ENAMEL SURFACE:

The interproximal corners are rounded with a cone-shaped triangular diamond bur with fine sand and cuttle discs. and finishing diamonds, proximal walls can be contoured to an acceptable morphology and texture. Final smoothing may be performed with even finer finishing instruments or 37% phosphoric acid gel as substantiated by Joseph and colleagues[14]. However, other authors have expressed their concerns regarding chemical stripping due to the susceptibility of the etched enamel to demineralization.

Furthermore, though in vitro studies have confirmed a smoother surface of proximal sealants compared with intact and stripped enamel the use of sealants after stripping is clinically seldom possible[15].
Lastly, technical difficulties in maintaining a dry working field, delay of the intraoral remineralization process, and cytotoxicity effects have been used against the sealing of the proximal enamel surfaces

10. CONCLUSION:

The available literature indicates that reduction of interproximal enamel surfaces represents a valid therapeutic modality in the hands of the orthodontist. This technique, when carried out properly, and in specific circumstances, may assist achievement of treatment objectives without compromising integrity of the dental and periodontal tissues

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