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Comparison of Efficiency of Conventional Extraction Forceps with Physics Forceps for the Extraction of Mandibular Premolar Teeth

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ABSTRACT:

BACKGROUND : In the era of rapidly developing dentistry especially implantology it is imperative to have a good base of alveolar bone to ensure adequate support for implant prosthesis. Rapid resorption of alveolar bone following removal of tooth is accelerated by damage to the buccal and lingual plates thus jeopardizing the implant placement. Hence techniques for atraumatic extractions like piezosurgery, vertical extraction, orthodontic tooth extrusion and use of physics forceps are gaining popularity.

METHODS : This study was conducted on 48 patients of age 18-50 years who require extraction of bilateral mandibular teeth. One side extraction was planned with conventional forceps and the other side with physics forceps. Total time taken for procedure, overall pain discomfort of the patients, incidence of root fractures, loss of alveolar bone, delayed healing and the presence of post operative swelling was evaluated.

RESULTS: This study shows that physics forceps takes significantly lesser time for the procedure and produce significantly lower pain and discomfort intra operatively and post operatively. Physics forceps also reduce the incidence of root fracture, alveolar bone, delayed healing and post operative swelling.

CONCLUSION : Physics forceps, an innovative technique is a promising option for ensuring atraumatic exodontia. The only disadvantage of the technique is initial learning curve and its high cost factor.

KEYWORDS: Surgical instruments; Tooth extraction; Alveolar process; Bone resorption; Alveolar bone loss; Physics forceps

I. INTRODUCTION :

Simple tooth extraction involves alveolar bone expansion, separation of the periodontal ligament and removal of tooth in coronal direction using forceps. Extraction of teeth results not only in changes of bony architecture, but also the overlying soft tissue contour and character is altered. The changes in the mucosal and soft tissue architecture depend on the changes happening in the alveolar bone surrounding the extraction site. Sufficient alveolar bone volume and favourable architecture of the alveolar ridge is mandatory to obtain functional and aesthetic prosthetic reconstruction. Reducing the trauma to the bone during an extraction clearly minimizes the incidence and severity of post operative complication, such as loss of alveolar height and width. All conventional extraction methods like the one using forceps and elevators traumatize alveolar bone by applying an excessive force on adjacent inter radicular bone and also causing contour changes of alveolus. Soft tissue trauma is one of the reasons for post extraction pain and various techniques have been tried to reduce the soft tissue trauma along with reducing the damage to alveolar bone. Powered periotomes, piezosurgery, laser, physics forceps and orthodontic extrusion and benex vertical extraction are few techniques that are in use for providing an atraumatic extraction. The physics forceps have a beak and bumper design that allows for efficient atraumatic extraction using only wrist movement. The physics forceps is really a tooth extractor rather than a forceps and uses first-class lever mechanics. The advent of this forceps helps to minimize the damage to alveolar bone and surrounding soft tissues.

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II. METHODS:

Study design :
the design of the study was split mouth study
study population:
the population of the study was 48.

Inclusion criteria:
Patients with age 18-50 without underlying medical condition or systemic disease require bilateral mandibular premolar extraction with intact periodontal support and intact adjacent tooth.
Exclusion criteria:
Uncooperative Patients , physically challenged patients, major systemic disease or medication, grossly decayed teeth, teeth with inadequate periodontal support, teeth with altered root morphology, root stumps were excluded.
Statistical analysis:

III. METHEDOLOGY:

A total of 48 healthy patients who reported to the department of oral and maxillofacial surgery requiring bilateral mandibular premolars and consenting for the study were included in the study. The study protocol was reviewed and approved by an institutional review board.

After taking detailed case history, the side of the extraction on the first day and the forceps to be used were chosen randomly by lot method. Inferior alveolar and lingual nerve block was administered using 2% lignocaine with 1:200000 adrenaline. Long buccal nerve block was also administered if mandibular molars had to be extracted.

In the conventional forceps group Molt's number 9 periosteal elevator was used to reflect buccal and lingual periosteum. Forceps was placed deep into the root surface and buccolingual movement were given for molar teeth and rotational movements were given in addition for premolars. Tooth was then delivered with forceps itself.

In the physics forceps group, following anesthesia Molt's number 9 elevator was used to reflect lingual mucoperiosteum and buccal mucoperiosteum is left intact. The beak of the forceps is engaged deep into the lingual aspect of the root. The disposable bumber is applied to the buccal aspect near the mucogingival junction. The entire unit is slightly rotated towards buccal by 2-3 degree and maintained around 20 seconds. If the tooth found to be not luxated even after 40-50 seconds further rotation is given. The luxated tooth is then removed with curved hemostat. Adequate hemostasis was achieved.

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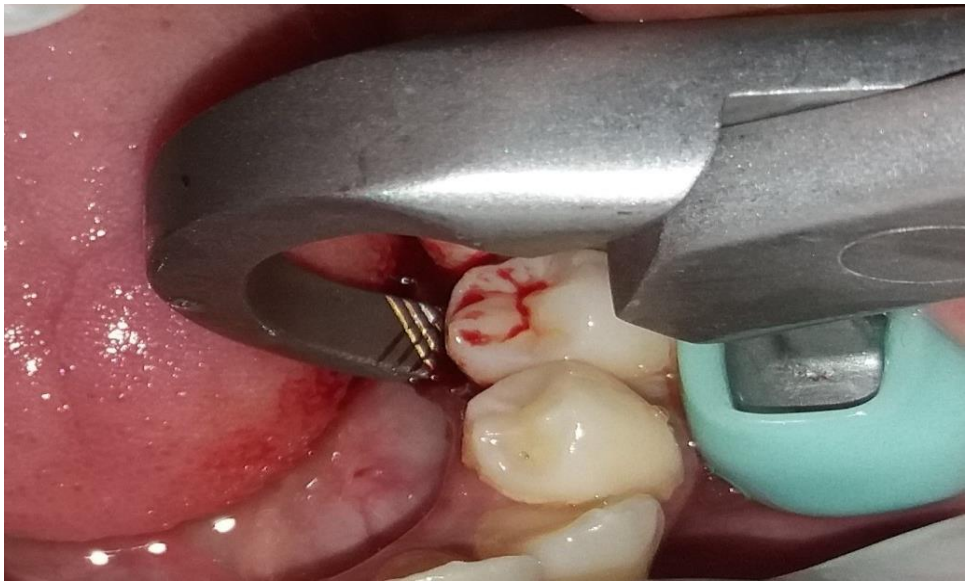


Following the extraction, patient was recalled on first, third and seventh pos operative day and visual analogue scale of 0-100mm was used to rate patients pain experience where 0 corresponds to no pain and 100 corresponds to worst possible pain.

IV. RESULTS :

Time taken for extraction :

mean time duration while using physics forceps for extraction was 39.27 seconds while that of conventional forceps was 46.04 seconds suggested that mean time duration while using conventional forceps was higher when compared to physics forceps with p value of 0.003.

bone loss:

in the study group there was three instances of alveolar bone loss (6.3%). Two were associated with mandibular first molar and one with a first premolar.

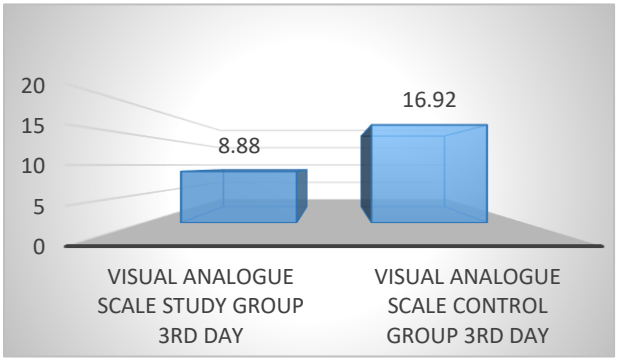
Delayed healing:

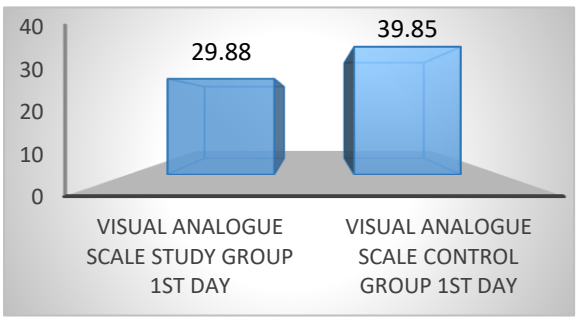
In the study group with physics forceps only one patient had delayed healing and in conventional forceps group three patients had delayed healing on the third day.

Swelling:

In the study group, swelling was present associated one each of first premolar, second premolar and second molar. Though there were more incidence of swelling in the conventional group, the results were not statistically significant with a p value of 0.549.

VAS score for pain:





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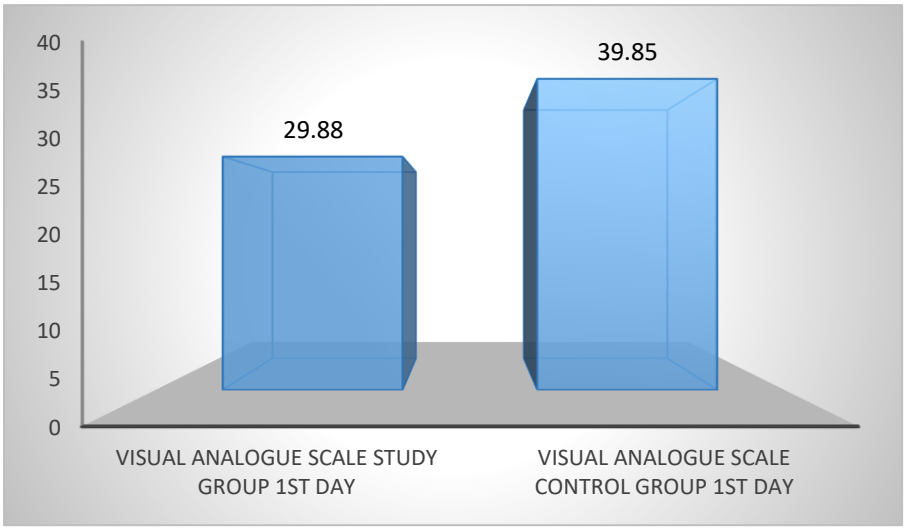

On comparison pf the mean values of VAS study group first day and VAS control group first day the mean values of visual analogue control group first day and post operative day three is higher with a difference of 9.979 and 22.937 respectively is statistically significant with a p value of <0.001 and .thus, the pain and discomfort in the study group one post operative day one is much higher than post operative day three and is statistically significant.

V. DISCUSSION:

Extraction of teeth is one of the most routinely performed procedures by oral and maxillofacial surgeon and general dentist since years. With recent advances in the field of dentistry and implantology, there is an increased need for achieving atraumatic extractions. The concept of atraumatic extraction involves minimizing the trauma to the periodontium and thus reducing post operative complication as well.

From the initial descriptions of extraction instruments, there has been a considerable variation to present day instruments. Currently used dental forceps are based on lever principle where the hinge acts as the fulcrum. Resistance is the tooth and the force corresponds to the force applied by the operator. Extraction being a surgical procedure is associated with many complications including delayed healing, prolonged pain and discomfort, fracture of the supporting alveolus and the roots. The alveolar bone and root fractures are usually due to excessive and incorrect application of forces

Pain is often a disturbing condition for the patient. The pain is caused by excessive liberation of inflammatory mediators in the immediate or late post operative period. The presence of pain is often a result of a delayed healing. Alveolar osteitis is associated with severe pain whereas acutely inflamed and infected sockets are associated with mild to moderate degree of pain. If the operative procedure is traumatic it leads to an excessive release of inflammatory mediators due to damage to the alveolar bone and the surrounding tissues thus increasing the pain sensationphysics forceps, an innovative technology was introduced by Golden Misch in 2004. The unique design of physics forceps enables the operator to minimize the force applied by them and utilizes the force applied by beak and bumber system to bring about more comfortable exodontias. The technique does not require the reflection of mucoperiosteal attachment thus exposure of bone is minimized and bone loss is eliminated.

In the studies conducted by various authors, comparing the efficiency of physics forceps and conventional forceps, the physics forceps was found to be superior and significantly better in parameters like overall time taken for the procedure, healing of the socket, and the pain and discomfort in the post operative period. The physics forceps exhibited lesser incidence of alveolar bone and root fracture.

There was no incidence of root fracture in the present study. But according to Hariharan et althere was fracture of one tooth in the level of middle third. El Kanawy found a statistically significant reduction in the incidence of root fracture when the physics forceps was utilized. Other studies also had a lower incidence of root fracture with physics forceps, but were not statistically significant. Thus, the physics forceps is

an excellent innovative method to reduce the incidence of root fracture. The occurrence of a root fracture may be due to the inexperience of the surgeon or due to an abnormal morphology of the root. Thus, with careful use, the physics forceps completely eliminate the risk of root fracture. Multi rooted teeth can be sectioned prior to the procedure and made into individual roots to minimize inadvertent fractures.

VI. CONCLUSION

In this study, the efficiency of physics forceps was compared with conventional forceps for routine removal of mandibular posterior teeth. Significant improvement was noted in the duration of extraction when using physics forceps. Patient underwent with this new technique had a significantly lower pain and discomfort. Physics forceps was also found to be better in terms of preservation of alveolar bone, minimizing the delayed healing and reducing the incidence of swelling though the differences were not statistically significant

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