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Editorial

Publication and effective dissemination to the peer community are vital to researchers. Publication of a research article represents the final stage of a scientific project. It is the culmination of meticulous planning, execution, and analyses of hundreds of experiments. As one of the main indicators of the level and quality of research output, publication in a journal is of great importance to researchers and their institutions which fund their research, as it improves their ratings.

Journal articles have been and are likely to remain indispensable in terms of academic scholarly achievement. A candidate's publication record is more readily quantifiable than excellence in teaching or service and has a distinct professional advantage over their less published peers.

Researchers should know that even though many avenues are available to make academic advances such as writing or editing a book, writing book chapters and monographs, delivering papers at learned societies, the type of contribution that is usually seen as the most significant effort to advance the knowledge base of their field is to publish in a journal.

Few years ago, promotion was earned primarily via excellence in teaching and service. Gradually more rigorous standards have been put forth by the Dental Council of India which has made publications compulsory. Virtually all standards for promotion and tenure include scholarly productivity as an important element in determining whether a candidate shall be advanced up in the academic hierarchy.

Due to these recent developments the publishing scenario has changed in our country. There was a time when the non-indexed journals had difficulty to bring out an issue for want of scientific articles. Now these journals are also flooded with articles causing a lot of delay in getting one's article published.

With few indexed journals available in our country and with other non-indexed journals having quite backlog of articles the need of the hour is to bring out more quality journals which can accommodate the extensive research work carried out in various institutions in the country. Keeping the above facts in mind this journal has been brought out and it seeks to publish articles which will enrich scientific knowledge and will strive to keep the same pace in the future issues.

On behalf of the editorial board, I extend my gratitude to the Management of the St. Gregorios dental college who were a pillar of strength in bringing out this journal. The editorial board would also like to thank the Principal, Prof. Dr. Jain Mathew and Dr. Tina Elizabeth Jacob, the associate editor for being for providing all assistance for publishing this journal.

Prevalence of Soft Tissue Calcification In Central Kerala Population : A Cross Sectional Study

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*

Abstract

Objective

The aim of this study was to detect the prevalence of soft tissue calcifications in panoramic radiograph

Study Design

200 digital panoramic images were used for this study. The images that were taken in Sirona, Orthophos XG panoramic machine previously were randomly included in the study. Soft tissue calcifications were recorded by an evaluator.

Results

Soft tissue calcifications comprised of 13 stylohyoid ligament process, 3 antrolith, 2 phlebolith,

tonsillolith, long and narrow hyoid bone and 1 myositis ossificans, calcified lymph node, calcified superior horn of thyroid cartilage each among the 200 radiographic image.

Conclusion

The prevalence of soft tissue calcifications on panoramic radiographs was relatively low in our study. Stylohyoid was the most prevalent calcification noted in our study.

Keywords:

Soft tissue calcification; Styloid process; Panoramic radiograph

Introduction

The soft-tissue calcifications of the head-and-neck region are physiological or pathological mineralization by deposition of calcium phosphate. It usually forms in an unorganized manner which is known as heterotopic calcification.

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The soft-tissue calcification can be dystrophic, metastatic or idiopathic¹. Dystrophic calcification is the one which occurs in a degenerating or inflamed or even a necrotic tissue. Metastatic calcification results from abnormal high levels of blood calcium or phosphate. Idiopathic calcification occurs in normal tissues. Here normal blood calcium level is maintained².

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Soft tissue calcifications that are frequently found in head and neck region and it is the common incidental findings in the dental practice.

There are some soft tissue calcifications that require treatment as it is a sequelae of an underlying systemic cause³. However, most are usually asymptomatic. The distinct radiographic appearance can often cause a confusion for the radiologist. Due to the greater coverage, panoramic radiographs are frequently used for identifying soft tissue calcifications. Knowledge of various parameters like anatomical location, distribution, number, size, and shape of the calcifications are the important in diagnosis of a soft tissue calcification⁴.

Materials and Methods

Source of Data: Digital panoramic scans of 200 subjects were considered for this study. The radiographs had been taken for different reasons other than current study. Total of 200 images were obtained randomly. All radiographs had been taken using a panoramic radiographic system (Sirona, Orthophos XG) with the exposure settings of 16 mA, 64 kVp, and 14.1 s time, according to patient's body size. Images with poor image quality were also excluded. Radiographs of patients with fracture, pathological lesions, and degenerative conditions were excluded

Results

Out of 200 scans 25 soft tissue calcifications were found. In that 13 calcified styloid process, 3 antrolith, 2 phlebolith, tonsillolith, long and narrow hyoid bone, one myositis ossificans, one

calcified lymph node, calcified superior horn of thyroid

Figure 1: Antrolith

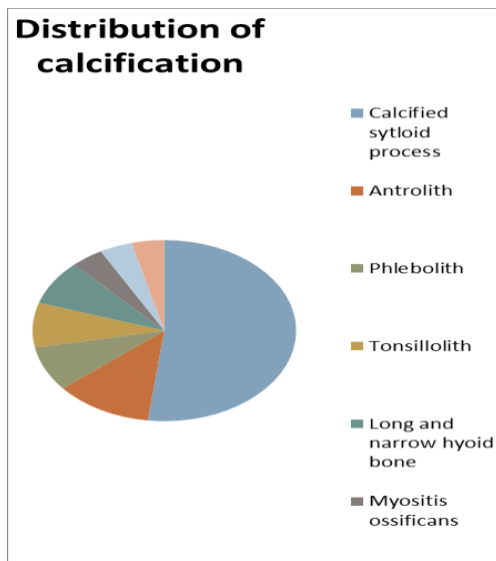
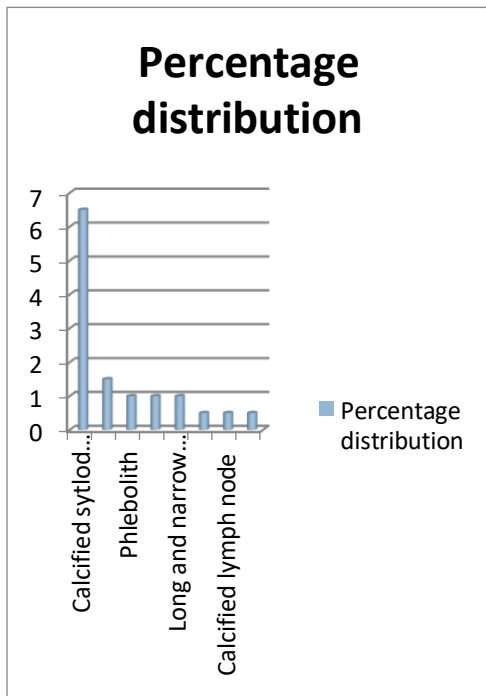


Figure 2; myositis ossifications



cartilage were found. In our study we detected higher prevalence of soft tissue calcifications ie 12.5% was more than the study by Vengaladh J et al⁵. Highest incidence was observed for stylohyoid ligament process which accounts for 6.5%. 1.5% of

antrolith were noted. Phlebolith, tonsillolith, long and narrow hyoid bone accounted for 1% and 0.5% of myositis ossificans, calcified lymph node, calcified superior horn of thyroid cartilage were noted.



Discussion

A total of 25 incidental findings were identified in 200 digital panoramic images. In this study, soft tissue calcifications represented with most frequent incidental finding were calcified styloid process, Phlebolith, Tonsillolith, Antrolith, Myositis ossificans, calcified lymph nodes and calcified superior horn of thyroid cartilage. Soft tissue calcification can be physiologic or pathologic. In some cases, presence of calcification can be associated with systemic diseases. Chronic renal failure associated soft tissue calcification has been reported. Eagle syndrome, sometimes called styloid or stylohyoid syndrome, is a symptomatic elongation of the styloid process or either an ossification or a calcification of the stylohyoid ligament complex characterized by dysphagia, tinnitus, and otalgia⁶. It may also cause stroke because of compressing the carotid arteries^{7, 8}. In this study, 13 cases of calcifications were found associated with Eagle's syndrome. The calcifications were in proximity to the bone surface in the posterior region of the lower jaw. Phleboliths are another set of soft tissue calcification which are found as venous malformations and are thought to be caused because of the calcification of an intravenous thrombus^{9, 10}. When swelling or hard masses occur in the sub mandibular or buccal region, phleboliths may be confused with sialoliths in the parotid or submandibular glands. The key to this differentiation is that both painful swelling and salivary colic are observed with sialoliths, whereas painless swelling is associated with phleboliths¹¹. Previous studies have showed more prevalence of carotid artery calcification which accounted for 2 to 11% whereas in our study we

couldn't find any. This may be attributed to the lower sample size and variability in valuation.

Conclusion

The prevalence of soft tissue calcifications on panoramic radiographs was relatively low in our study. Stylohyoid was the most prevalent calcification noted in our study. Apart from not including the gender, age, the demographic parameters sample size was too low to note the significant changes. Their basic aim was to note any random calcifications in routine radiographs and to raise an awareness in differentiating calcifications from normal anatomical landmarks and artifacts' larger study including all these parameters will help even in identifying an occult systemic condition.

References

1. White SC, Pharoah MJ. Oral radiology: principles and interpretation. 7th ed. Canada: Elsevier Health Sciences; 2014. p. 524-541.
2. Soft Tissue Calcification in Oral and Maxillofacial Imaging: A Pictorial Review. *Int J Dentistry Oral Sci.*03(4): 219-224.
3. Caglayan F, Sumbullu MA, Miloglu O et al. Are all soft tissue calcifications detected by cone-beam computed tomography in the submandibular region sialoliths? *J Oral Maxillofac Surg.* 2014;72(1531).e1-e6.
4. Kirsch T. Determinants of pathological mineralization. *Curr Opin Rheumatol.* 2006; 18: 174-180
5. Vengalath J, Puttabuddi JH, Rajkumar B, Shivakumar GC. Prevalence of soft tissue

- calcifications on digital panoramic radiographs: A retrospective study. *J Indian Acad Oral Med Radiol* 2014;26:385-9.
6. Chouvel P, Rombaux P, Philips C, Hamoir M. Stylohyoid chain ossification: choice of the surgical approach. *Acta Otorhinolaryngol Belg.* 1996;50:57-61
7. Chuang C C, Lin H. C., and Huang C. W., "Submandibular cavernous hemangiomas with multiple phleboliths masquerading as sialolithiasis," *J Chin Med Assoc.*2005;68(9).441-443.
8. Suarez-C MM, Dueker J, Seoane-L J et al., "Tonsilloliths associated with sialolithiasis in the submandibular gland," *J Oral Maxil Surg.* 2008; 66(2).70-373.
9. McMenamin M, Quinn A, Barry H et al "Cavernous hemangioma in the submandibular gland masquerading as sialadenitis: Oral surg Oral Med Oral Pathol Oral Radiol Endod 1997;84{2}.146-148
10. Levy D. M, Remine W. H, Devine K. D, "Salivary gland Calculi," *JAMA.* 1962;181(13).1115-1119.
11. Feldman VB. Eagle's syndrome: a case of symptomatic calcification of the stylohyoid ligaments. *J Can Chiropr Assoc.* 2003;47:21-27.

DERMATOGLYPHIC PATTERNS AND THEIR INHERITANCE FROM PARENTS, IN CHILDREN WITH EARLY CHILDHOOD CARIES AND CARIES-FREE CHILDREN - A COMPARATIVE STUDY

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ABSTRACT

Background: Dermatoglyphic patterns in humans are established by the 6th-13th week *in utero*. They are assumed to be genetically controlled and stay constant during life.

Aims: The aim of the study was to compare the Dermatoglyphic pattern in children with Early childhood caries and caries-free children and to study the inheritance of dermatoglyphic patterns in children with the Early childhood caries from their parents.

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Settings and Design: The study sample included, forty school going children from a Bangalore urban area (South Indian origin). The test population included 20 children diagnosed with Early childhood caries, along with their parents and 20 Caries-free children as the control population.

Statistical Analysis: Independent samples t-test.

Results and Conclusions: The study demonstrated that there is significant change in the dermatoglyphic pattern between children with Early childhood caries and caries free children. Dermatoglyphic analysis of children in the test group and their parents revealed there is close association of patterns between the child and the mother. Recording of dermatoglyphic patterns helps in predicting the risk for a child to develop Early childhood caries.

Key Words: Dermatoglyphic patterns, Early childhood caries, Risk prediction, Inheritance.

INTRODUCTION:

Skin functions as a cloth for the human body. It performs many vital functions in the life of an individual, viz. it protects and safeguards the body from the vagaries of the weather, maintains the body temperature and saves the internal organs of body from the injuries. Dermatoglyphics – the study of pattern traceries of fine ridges of fingers, palm and sole have been a useful tool for personal identification. It proved important due to the fact that (1) unlike most human tracts; dermal ridges and configurations formed, are not affected by age and environment (2) Detailed structure of individual ridges is extremely variable.¹

The causative factors and mechanisms involved in ECC (Early childhood caries) are basically same as other types of coronal caries. Children experiencing caries as toddlers, have a much greater probability of subsequent caries in primary and permanent dentitions. Moreover Infants with ECC grow at a slower pace than caries free children.² Relationship between

Dermatoglyphics and dental caries is that the finger buds and dental enamel are of ectodermal origin and both develop at the same time during intra-uterine life. The purpose of this study was to find out the relationship between the dermatoglyphic patterns and ECC. And also to find out the inheritance pattern of ECC.

MATERIALS AND METHODS

CASE SELECTION

Children in the age group of 3-6 years were examined and the recording was done under natural illumination. A complete case history was recorded to rule out any other abnormality. Children excluded were those suffering from skin disorders, systemic disorders, physical and medical incompatibilities, and un-cooperative patients. 40 children (20 controls + 20 tests) were included in the study. Children selected for the study were of south Indian origin. The presence of one or more decayed (non-cavitated or cavitated lesions), missing (due to caries), or filled tooth surfaces in any primary tooth in a child 71 months of age or younger was considered for case selection (test group) as per the working definition of AAPD (American Academy of Pediatric Dentistry). Children without caries were included in the control

group. Parents of ECC group were also included in the study to find out the hereditary component.

DERMATOGLYPHIC PATTERN RECORDING AND INTERPRETATION

Dermatoglyphic patterns of all 10 palmar digits were recorded using Cummins and Midlo method.³ Fingerprints were recorded as follows. Initially, hands were scrubbed thoroughly with an antiseptic lotion and allowed to dry. Ink was applied gently on to the hand using a cotton pellet (Figure - 1). Following this, the hand was pressed firmly against bond paper that was placed on a smooth surface board, 2-3 times on different sheets (Figure -2). In this method, third recording was satisfactory and readable (Figure -3). The parameters scrutinized were the ridge configurations (Arch, Loops or Whorls) and the 'atd' angle (Figure 4). Same procedure was repeated for the left hand. After recording, the ink was removed from the hand by washing hands with the combination of washing powder, surgical spirit, and water. In this way, a total of 800 palmar prints were obtained. In the present study the dermatoglyphic patterns analyzed were the ridge configurations and 'at' angle. The recorded 'atd' angle was measured using a

protractor. These dermatoglyphic patterns were analyzed with the help of a magnifying glass (10x), with respect to available standards and data were tabulated.



FIGURE-1

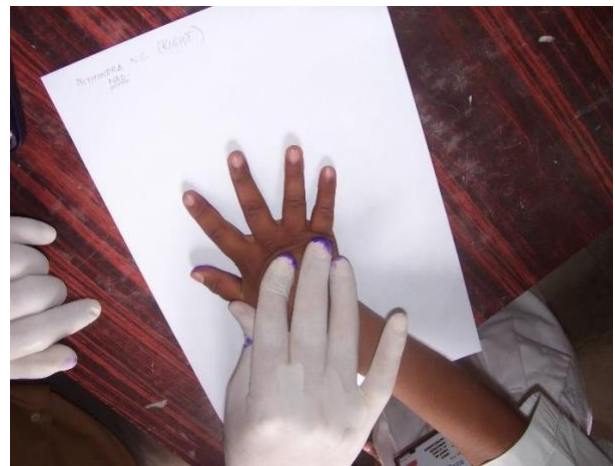


FIGURE -2

FIGURE -4

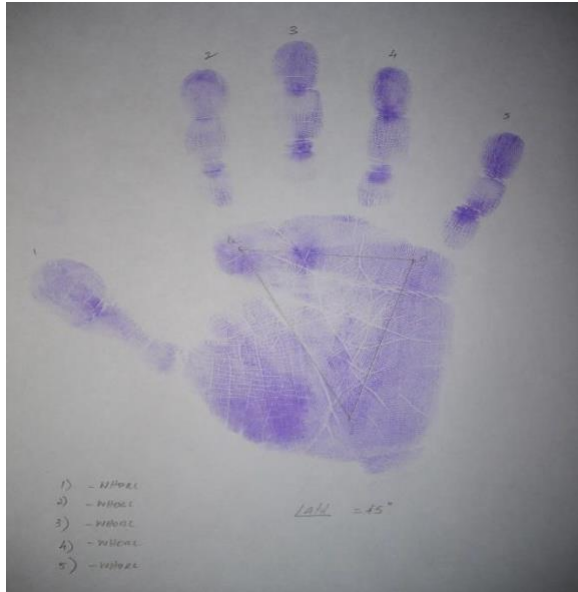
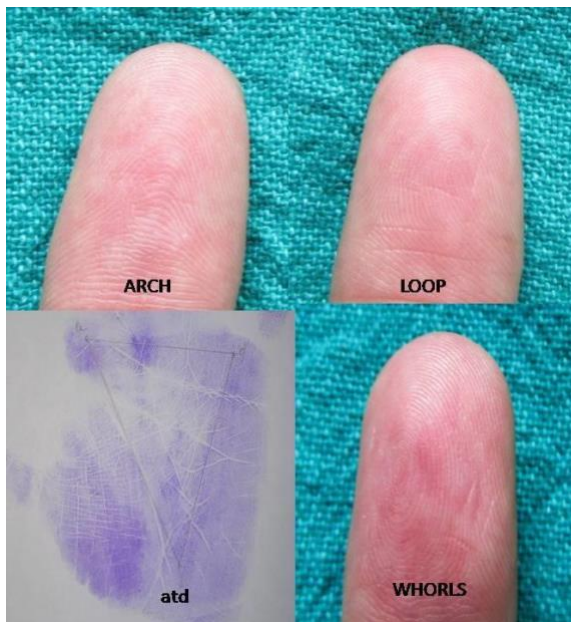


FIGURE - 3



RESULTS

Dermatoglyphic comparison between test group and control group

Results showed there was significant change in the dermatoglyphic pattern between the ECC and the control group. The frequency of loops was found to be more in ECC group and the frequency of whorls more in control group

Higher no. of loops was recorded in the test group (65%) compared to the control group (38%). The difference in proportion of loops between test group and control group was found to be statistically significant ($P < 0.001$), (Table I). The no. of whorls was found to be higher in control group (52%) when compared to the test group (29%) and this difference in proportion of whorls between test group and control group was found to be statistically significant ($P < 0.001$), (Table I).

There was no significant change in 'atd' angle between the two groups.

Dermatoglyphic comparison between test group and their parents

There was considerable difference in the dermatoglyphic patterns between the father and child suggesting there is no association between them. There was no significant difference in the dermatoglyphic patterns between the mother and child. The results showed there is a strong association between the patterns of the mother and child. (Table II).

There was no significant change in 'atd' angle between the two groups (Father and child, Mother and child).

DISCUSSION

The term 'Dermatoglyphics' was coined by Dr. Harold Cummins, the father of American fingerprint analysis. Sir Francis Galton in 1892 classified dermatoglyphics into 3 basic types A) Arches B) Loops and C) Whorls. An arch is formed by a succession of parallel ridges, which traverse the pattern area and form a curve that is concave proximally (FIGURE). A loop is formed by a series of ridges entering the pattern area on one side of the digit, recurves abruptly, and leaves the pattern area on the same side (FIGURE). A whorl is any ridge configuration with two or more triradial (FIGURE-). A triradii is formed by the confluence of three ridge systems. The geometric center of the triradius

is designated as a triradial point. 'atd' -angle is the angle between the a- triradius (under the index finger), t -the axial triradius (near the wrist), and the d-triradius (under the little finger) .¹ Identical twin share extremely similar dermatoglyphic patterns but however they are usually small, but detectable differences between them. Hence, it can be confirmed that dermatoglyphic patterns and counts are not only under genetic control but also influenced by environmental factors. Even though 10 fingers of the hand derive by mitosis and share a common set of genetic information (totipotency), they don't look the same because each finger is surrounded by different microenvironment. The left and right hand of a common genotype show different patterns in each hand because there must be some local environmental effects during development that influence the ridge patterns.¹

Schaumann and Alter in 1976 postulated that ridges are influenced by blood vessel- nerve pairs at the border between the dermis and epidermis during prenatal development. Features such as inadequate oxygen supply, abnormal nerve growth, unusual patterning or distribution of sweat glands, alterations of epithelial growth, or other features could influence ridge patterns. Because the growth is a dynamic process, one of which is many

components contribute and mutually interact, there must be many genes involved.⁵

Dermatoglyphic patterns can be recorded in many ways. The choice of technique should be based on the criteria that it should be less time consuming, economical and data obtained should be of good quality. Recording Dermatoglyphics are broadly classified into three types A) Printing B) Molding C) Photographic techniques.⁶ In modern times these techniques are outdated. Computerized method of recording and analysis, semi-automatic readers of ridge counts are the latest methods of recording dermatoglyphics but the need for sophisticated gadgets is a drawback.

The relation between Dermatoglyphics and medical field is long standing. Dermatoglyphics has strong correlation with heart diseases (Mitral valve prolapse), breast cancer, Trisomy 21, Tuberculosis, Alzheimer's disease, cancer.⁷

Studies done on correlation between dermatoglyphics, and dental caries revealed that there was a decreased frequency of loops in carious group whereas there was an increased frequency of loops in non-carious group.^{8,9}

In contrast to the results obtained from the previous studies, the present study showed that the percentage of loops were more in the Early

childhood caries group than in the caries free group. This result can be attributed to the fact that there is considerable difference in dermatoglyphics in people of different regions. A study carried out in Northern part of India revealed that there is considerable variation in the dermatoglyphic patterns between North, South, East, and West Indian population.¹⁰

There are various studies carried out to find out the association between maternal- child characteristics ie., considering the mother-child DMFS scores, salivary *S. mutans* levels in mother and child. All these studies have concluded that there is a strong association between ECC and maternal characteristics.¹¹

In the present study, the dermatoglyphic patterns in ECC children and parents revealed there was significant association between the mother and the ECC child. i.e., percentage of loops were more in both the mothers and ECC children. There was no significant difference in the atd angle between the 2 groups. The possibility of child acquiring ECC depends upon the dermatoglyphics of parents; the chances are listed as follows.

MOTHER	FATHER	CHILD	DENTAL CARIES
LOOP	LOOP	LOOP	YES(VERY HIGH)
LOOP	ARCH	LOOP/ARCH	YES
LOOP	WHORL	LOOP/WHORL	YES
ARCH	LOOP	ARCH/LOOP	YES
ARCH	ARCH	ARCH	NO
ARCH	WHORL	ARCH/WHORL	NO
WHORL	LOOP	WHORL/LOOP	YES
WHORL	ARCH	WHORL/ARCH	NO
WHORL	WHORL	WHORL	NO

ECC is not a unifactorial phenomenon. It is influenced by innumerable number of factors and there are studies which proved them. Some of the common factors are bottle usage, bottle content, age, number of teeth with S. mutans, DMFS scores, salivary components (composition, nature, function, pH, buffering capacity, immune responses etc), snacking habit, plaque micro flora etc.¹¹⁻¹²

The relation between dermatoglyphics and ECC may be indirect, ie., children with loop patterns may have alterations in saliva (composition, nature, function, pH etc.), immunity, snacking habits (eating more sticky foods, frequent eating), mind temperament etc.

CONCLUSION:

Following conclusions were drawn from the study

A) There was a definite difference in the dermatoglyphic pattern between the ECC group and caries free group.

- In test group the percentage of loops were found to be more.

- Where as in the control group the percentage of whorls were found to be more.

B) There was no considerable significant change in the atd angle between the two groups.

C) Dermatoglyphic patterns recorded from the parents showed that there is association between the dermatoglyphic patterns of children with ECC and their mothers.

Shape	Test group (n=200)	Control group (n=200)	Z	P-Value
Loops	130	75	5.50	<0.001*
Whorls	58	104	-4.59	<0.001*
Arches	12	21	1.64	<0.102

TABLE I: Comparison of the Dermatoglyphic patterns between children in test group & the control group

Shape	Children (n=200)	Mother (n=200)	Z	P-Value
Loops	130	125	0.52	0.603
Whorls	58	45	1.50	0.135
Arches	12	30	-2.94	0.003*

TABLE: II Comparison of dermatoglyphic patterns of children in test group with that of mother

D) There was no considerable significant change in the “atd” angle between the test group and the parents group.

CLINICAL SIGNIFICANCE

The clinical significance of the present study is

- A) Recording the child's dermatoglyphics during the first visit will help the dentist classify the child under Low, Medium or High caries risk group. Hence recording of dermatoglyphics should be included in Infant oral health care program.
- B) The importance of recording dermatoglyphics of parents is to help in predicting the child's risk for developing ECC, so that preventive measures can be started at a very early age.

REFERENCE

1. Cumins H, Midlow C. In finger prints, palm and soles; an introduction to dermatoglyphics. Dover Publication Inc , New York 1961
2. Acs G, Shulman R, Ng MW, Chussid S *Pediatr Dent* 1999;21(2):109-113.
3. Cummins. Revised methods of interpretation and formulation of palmar dermatoglyphics. *Am J Phy Anthr* 1929
4. Priest J. Dermatoglyphics in medical disorders. *Am J Hum Genet.* Jul 1977; 29(4): 410– 411.
5. Madan N, Rathnam A, Bajaj N. Palmistry: A tool for dental caries prediction! *Indian J Dent Res* 2011;22:213-8.
6. Sharma A, Somani R. Dermatoglyphic interpretation of dental caries and its correlation to salivary bacteria interactions: An in vivo study. *J Indian Soc Pedod Prev Dent* 2009;27:17-21.
7. Sharma P. R., Gautam A. K. & Tiwari P. K. Dermatoglyphic variations in five ethnogeographical cohorts of Indian populations: A Pilot Study . *The Internet Journal of Biological Anthropology.* 2008 ; 2: 1

PROSTHETIC REHABILITATION OF AN OCULAR DEFECT

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ABSTRACT:

The eye is a vital organ not only in terms of vision but also being an important component of facial expression. The rehabilitation of a patient who has suffered from an ocular loss, requires a prosthesis that will provide the optimum cosmetic and functional results. A 42-year-old male reported to the Department of Prosthodontics, with a missing right eye. Treatment of such cases includes implants and acrylic eye prosthesis. Although ocular implant eye prosthesis has superior outcome, due to economic factors it may not be advisable in all patients. So, a custom-made ocular prosthesis is a good alternative. A case of a custom-made ocular acrylic prosthesis is presented here, which had acceptable fit, retention and esthetics.

Key Words: Custom made ocular prosthesis, ocular defect and enucleation

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INTRODUCTION

Loss of an eye can be caused by a congenital anomaly, trauma, tumor, or even the need for histological confirmation of a suspected diagnosis. Significant physical, emotional, and psychological consequences result from facial disfigurement'. The rehabilitation of a patient suffering such loss requires an ocular prosthesis. The primary purpose of any ocular prosthetic rehabilitation is to regain eye socket volume and to provide an illusion of a normal healthy eye and surrounding tissues.²

Surgical procedures for the removal of an eye can be broadly classified as evisceration (where the contents of the globe are removed leaving the sclera intact), enucleation (most common, where the entire eyeball is removed after severing the muscles and the optic nerve), and exenteration (where the entire contents of the orbit including the eyelids and the surrounding tissues are removed).^{3,4,5,6}

The rehabilitation of a patient who has experienced eye loss requires a prosthesis that will provide optimal esthetic and functional results. In such cases, collaboration between a maxillofacial

prosthodontist and an ophthalmologist is necessary. Today, the majority of patients are rehabilitated with an artificial eye made of acrylic, and conventional ocular prostheses fabricated by heat-cured acrylic resins that are the most common type of eye prosthesis.^{7,8,9}

Anecdotal reports and relics from ancient civilization indicates that restoration of ocular defect have existed for thousands of years. The earliest known example dates to fourth dynasty (2613-2494 B.C) in Egypt. Materials used for rehabilitation were found to be precious stone, earthen ware, bronze, copper and gold. As literature provides, it was the 16th century when pare fabricated an ocular prosthesis using glass and porcelain for eye¹⁰. But after the World War II, it became difficult to obtain glass eye from Germany and then acrylic resin became material of choice for fabrication of eye prosthesis. Unlike glass eye, the acrylic resin eyes are solid, the material is light weight, easy to fabricate, have intrinsic and extrinsic coloring capabilities, and was inert to the socket linings. Through the years, the techniques and materials have constantly improved^{10,11}.

An ocular prosthesis is an artificial substitute for an enucleated eyeball. An ocular prosthesis may be available readymade (stock ocular prosthesis) or can be custom made¹². A stock ocular prosthesis can be custom made. When time limitation exists, and the cost factor is taken into consideration¹³. But many disadvantages exist in a stock ocular prosthesis, such as ill-fitting, improper shade matching, and so on. Custom-made ocular prosthesis increases the adaptiveness, movement of the eyeball, and exactly matches the iris position as that of the adjacent natural eye¹⁴

In the present case report a simple and effective method of fabricating an ocular prosthesis has been discussed.

CASE REPORT

A male patient aged 42 years presented to the Department of Prosthodontics to restore his missing right eye (Fig 1.). History revealed enucleation of left eye following accidental injury 1 year back. Examination of the eye socket showed healthy conjunctival lining. There was adequate depth between the conjunctiva, which could be utilized for better retention of the prosthesis. The treatment plan included fabrication of a custom-made ocular prosthesis. The

fabrication procedure, maintenance and limitations were explained to the patient.

PROCEDURE

After disinfecting and lubricating the eye socket, impression was made with irreversible hydrocolloid material for replication of the socket (fig 2). The impression was removed after it was set and poured with dental stone up to the height of contour. After the stone was set, separating media was applied and remaining impression was poured in two pour techniques. (Fig 3)

The cast was retrieved from the impression and prepared for wax pattern fabrication by coating a layer of separating media on to the defective surface before the molten wax was poured. The wax pattern was smoothed to remove any sharp ridges and undesirable irregularities (Fig 4). The fit of the pattern was checked in the patient's eye by observing the extension of wax pattern into the conjunctiva. The areas of over extensions were adjusted by contouring the wax. The contour and support of the eye lid with the pattern was checked while the eye was in open and closed positions. (Fig 5)

After checking the fit, contour, and support of the pattern, middle of the pupil was

marked when patient looking straight. The size of the iris of the adjacent eye was measured and then a customized iris button was placed and tried in the patient for orientation. (Fig 6). After satisfactory orientation was achieved, the wax was removed from the socket.

Later it was flaked and processed with heat cure white acrylic resin (fig7) and was polished using pumice. (Fig 8)

After trimming and polishing with the help of ordinary watercolor cornea painting was done which was trimmed 1 mm short. Using a thin brush many strokes around iris to the periphery were painted to match the color of natural eye appearance. Later fine red threads were placed on the scleral portion to mimic the blood vessels. The entire scleral portion was coated with a thin layer of clear acrylic resin to keep the blood vessel fibers and the painting in place. Once it was set, the scleral blank was replaced on to the flask and the processing was done with clear acrylic. After the processing was completed, it was polished using pumice.

After thoroughly cleaning the prosthesis, it was inserted and checked for fit, contour, and movements. (Fig 9)

DISCUSSION

The disfigurement associated with the loss of an eye can cause physical and emotional problems¹. The major advantages of a custom ocular prosthesis are improved fit, mobility, and esthetics. Several techniques and materials have been introduced throughout the years to fabricate ocular prostheses, including custom made and modified stock ocular prostheses, made from glass or MMA[Methyl Methacrylate]³. Similarly, various techniques of iris painting have been introduced: paper iris disc technique, black iris disc technique and monopoly with dry earth pigment¹⁶. Recently, digital imaging has been used to replicate iris. Bionic devices are also being developed to rehabilitate the defective part. If this system is fully developed it will change the lives of millions of people around the world. It might not restore vision fully, but can help them at least to find their way, recognize objects and above all lead an independent life²

CONCLUSION

Ocular prosthesis has a long history of successful use, and variations of the techniques and materials used have been introduced throughout the years¹². A blind man does not want sympathy; he needs apathy and acceptance as one in the society.

In this article a relatively easy and inexpensive technique of customization of stock eye has been presented¹². The success of this technique depends on an accurate impression of the eye socket and on the availability of a closely matching stock eye. Although the patient cannot see with the prosthetic eye, it can restore him back his confidence and esthetics¹⁵.



Fig 1: Pre treatment photos showing enucleated right eye

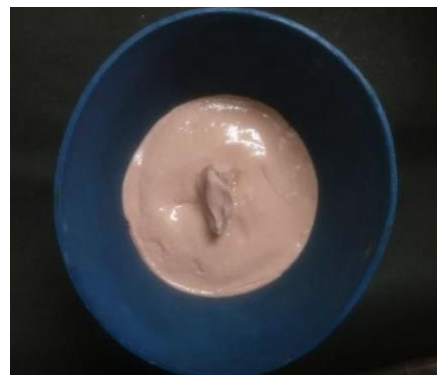


Fig 2: Impression of the eye socket



Fig 3: Poured cast



Fig 4: Wax trial



Fig 5: Marking of the pupil line



Fig 7: Flasking of the pattern



Fig 6: Placement of iris button and ckecking in patient for orientation



Fig 8: Polished prosthesis

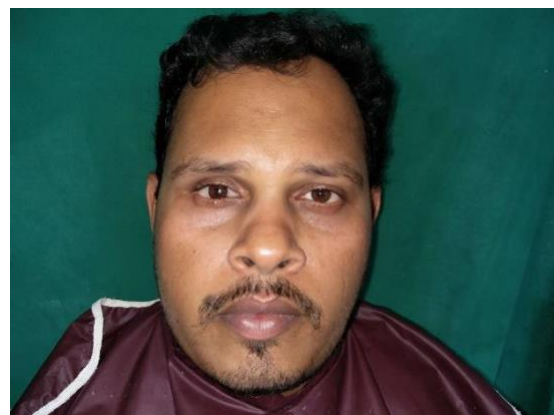


Fig 9: Post treatment view with the prosthesis in place

REFERENCES

1. Khan AD, Ahmad N. Prosthetic Rehabilitation of an Ocular Defect with customized Iris-A Case Report. *IP Ann Prosthodont Restor Dent* 2015;1(1):40-43
2. Jurel SK, Talwar NS. Customization of Stock Eye Prosthesis for a Pediatric patient by a Simplified Technique. *Int J Clin Ped Dent* 2012; 5(2): 155-158.
3. Fernandes AU, Goiato MC, Batista MA, Santos DM. Color alteration of the paint used For iris painting in ocular prostheses. *Braz Oral Res* 2009; 23:386-92.
4. Chiramana S, Anne G, Ravuri K, Bhoppana PP, Kumar S, Appana KC, et al. A time saving method to fabricate a custom ocular prosthesis. *J Orofacs Res* 2013; 3:42
5. Nafij BJ, Theerathavaj S, Mohammad KA. A complete procedure of ocular prosthesis: A case report. *Int Med J* 2013; 20:729-30.
6. Kaur A, Pavaiya A, Singh SV, Singh RD, Chand P. A simplified approach to fabrication of an ocular prosthesis: A case series. *Indian J Dent Res* 2010; 21:615-7.
7. Doshi PJ, Aruna B. Prosthetic management of patient with ocular defect. *J Ind Prosthodont Soc* 2005; 5:37-8.
8. The academy of prosthodontics. The glossary of prosthodontic terms. *J Prosthet Dent* 2005; 94:10-92.
9. Artopoulou II, Montgomery PC, Wesley PJ, Lemon JC. Digital imaging in the fabrication of ocular prostheses. *J Prosthet Dent* 2006; 95:327-30
10. Laxman S, Jose S. Prosthetic Management of a patient with Ocular Defect with Ocular Prosthesis - A case report. *J Orofacial Research*; 2011; 1(1):31-33.
11. Padmanabhan, TV and Mohamed K. Prosthetic Rehabilitation of an Orbital and Facial Defect: A Clinical Report. *J Prostho*; 2012; 10(2); 200-204.
12. Ram H and Shah R. Simplified method for Ocular Rehabilitation: - A Case Report *J Dent Med Sci*; 2013; 3(4): 10-13.
13. Lemona JC, Kiat SL. Facial prosthetic rehabilitation: preprosthetic surgical techniques and biomaterials. *Oto Head Neck Surg*; 2005; 13(3):255-262.
14. Muaiyed MB, Yusnidar TA. Ocular Defect Rehabilitation Using Photography and Digital Imaging: A Clinical Report *J Prostho*; 2015; 10(3)506-510.
15. Cherian K and Mamman A. A Simplified Method of Fabricating ocular prosthesis using Stock Conformers: A Clinical Report *TC*; 20(2); 387-389.
16. Sonune SJ, Sharma D. Interdisciplinary approach: A boon for ocular rehabilitation. *Oman J Ophth*; 2014; 7(3); 157-159.

BIMAXILLARY DECUPLE IMPACTED SUPERNUMERARY TEETH

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ABSTRACT

Supernumerary Teeth is the developmental anomaly affecting the tooth number. Multiple supernumerary teeth are frequently associated with syndromes like Gardner Syndrome, Cleidocranial Dysplasia. The exact etiology is unknown. The presence of these may predispose to certain complications like crowding, delaying or prevention of eruption of the permanent teeth, displacement, root resorption and cystic lesions. Meticulous examination and integrative planning are essential to manage them.

OBJECTIVE: Management of multiple impacted supernumerary teeth in a non-syndromic patient under Local Anesthesia.

CASE REPORT: The case involves a 12-year-old male patient with ten impacted supernumerary teeth in maxillary and mandibular premolar region. The supernumerary teeth were found on the lingual aspect of mandible and the palatal aspect of maxilla. The surgical procedure was performed on each quadrant in a time interval two weeks. Postoperatively, antibiotics, anti-inflammatory and analgesics were given.

CONCLUSION : The surgical procedure had a good prognosis and the healing was found satisfactory.

Keywords : Supernumerary tooth (ST), multiple, impacted

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INTRODUCTION

Supernumerary teeth also known as Hyperdontia is a developmental anomaly affecting the normal number series of tooth. It is a condition characterized by the presence of one or more teeth than the normal sequence of dentition developed anywhere in the oral cavity or jaws. It most commonly affects the permanent dentition compared to

primary and the gender predilection is seen in males without any plausible explanation⁸. They frequently occur in anterior maxilla and molar region while multiple supernumeraries are predominantly reported in mandibular premolar region. Supernumerary teeth are usually occasional, but closely associated with certain syndromes like Cleidocranial dysplasia, Gardner syndrome^{2,4} Familial adenomatous polyposis, Trichorhinophalangeal syndrome type 1, etc. Only a few cases of non-syndromic supernumerary teeth were reported. The precise etiology is unknown, however, there exists numerous theories explaining the etiology. The pathogenesis of supernumerary teeth is the continuous proliferation of permanent or primary dental lamina to form third tooth germ and the splitting of permanent bud itself.

The most frequent complication of having supernumerary teeth is the dental malposition^{4,5} of teeth of the normal series (erupted or not) which in turn leads to clinical consequences of orthodontic and/or surgical nature; more rarely, impacted supernumerary teeth are the cause of follicular cysts, neuralgic manifestations, dysodontiasis of permanent teeth⁴.

The detection of ST [supernumerary teeth] is through clinical investigations in erupted cases and in impacted STs, radiographic

investigations must be performed. The various radiographic methods include Panoramic radiographs and periapical radiograph of the suspected area. Cone-Beam Computed Tomography (CBCT) can be used to better evaluate the case more accurately. CBCT images allows the identification of the position of the abnormalities and their proximity to important anatomical structures^{7,8}.

The concept of treatment depends on the age and position of the teeth. Removal of the impacted multiple teeth is usually performed under General Anesthesia in a single surgical intervention. Considering patient anxiety and cost of procedures involved during General Anesthesia, the treatment can be performed under local anesthesia.

CASE REPORT

A twelve-year-old male patient reported to the clinic complaining pain associated with decay in upper and lower left back tooth region. In the general health history, syndromes or systemic diseases were not detected. Medical and familial history revealed no significant findings. The clinical intraoral examination pointed to a dentition without apparent abnormalities. On examination, grossly decayed mandibular left

first molar and multiple retained deciduous tooth were found. The patient was advised intra oral periapical radiograph of the same and Panoramic radiograph.

The panoramic radiograph revealed presence of multiple impacted Supernumerary tooth in maxillary and mandibular premolar region of both sides (Fig 1) On investigation, multiple ST; ST1,ST2 in maxillary right premolar palatal region, ST3,ST4 in maxillary left premolar palatal region, ST5,ST6 in mandibular left premolar lingual region and ST7,ST8,ST9,ST10 in mandibular right premolar lingual region were found impacted respectively. The patient was advised orthodontic fixed mechanotherapy following surgical extraction of all impacted supernumerary teeth. Cone-Beam Computed Tomography CBCT (Fig 2) was performed for the localization of these tooth in three-dimensional view and its orientation in relation to adjacent bony structures and soft tissues.



Fig 1 : Pre-Surgical Orthopantomograph



Fig 2 : CBCT images of maxilla and mandible

The clinical and radiographic investigations concluded multiple impacted supernumerary teeth in no syndromic patient with retained

53,63 and 74. Beneath these teeth, were the STs preventing the eruption of premolars. Surgical planning was done after clinical and radiographic evaluation (panoramic radiography and CBCT), to preserve sound bone and soft tissues.

The surgery in maxilla was done under Posterior Superior Alveolar Nerve Block, Buccal Infiltration, Nasopalatine and Greater Palatine Nerve Block. In Mandible, Inferior Alveolar, Mental and Lingual Nerve block was given. Crevicular incision was given, and full thickness mucoperiosteal envelope flap raised. The bone removal was done using round bur and 702 straight fissure surgical burs with copious irrigation of saline. Flap closure was done using horizontal mattress sutures.

The surgical removal of all supernumerary teeth along with the deciduous teeth in the same quadrant were performed consecutively after a healing period of 2 weeks. Postoperatively the patient was given antibiotics, analgesics, anti-inflammatory and vitamin supplements for a period of 7 days. The healing was found satisfactory without any complications.



Fig,3.aMaxillary,Surgical,Site



Fig 3.b : Supernumerary teeth removed from Maxillary right quadrant



Fig 4a: Mandibular Surgical Site



Fig 4b : *Supernumerary teeth removed from Mandibular right quadrant*

DISCUSSION

Hyperdontia is an odontostomatologic anomaly characterized by an excess in tooth number, both erupted and unerupted. It can be described as “real” if determined by an increased number of teeth, otherwise it is “false” if caused by a delay in shedding of primary teeth beyond the transition period. It is well known that ST appear in association with variety of syndromes and that their presence in non-syndrome affected patients is rare¹⁰.

The etiology for the development of ST is unknown to date and since several years ago, different theories as hyperactivity of the dental lamina, splitting of a tooth bud, a dichotomy mechanism and atavism have been proposed to explain the development of ST¹⁴

The occurrence of non-syndromic supernumerary teeth is more often in maxilla

than in mandible, in males than in female, in permanent dentition than in primary dentition, and unilaterally than bilaterally. Patients with nonsyndromic supernumerary teeth might be related to heredity factor, therefore familial history should be carefully examined. Maintaining a supernumerary tooth could result in the appearance of different abnormalities.

The presence of unerupted ST can cause delay in eruption, displacement and root resorption of permanent teeth. It is also a risk factor for the development of odontogenic cyst and tumors.

The early diagnosis of supernumerary teeth is achieved by clinical and radiographic investigation. Supernumerary teeth can be asymptomatic, and can be diagnosed during a routine radiography². Mostly, they are associated with clinical complications related to dental impaction, delayed or ectopic eruption of adjacent tooth. The clinical examinations and radiographies are crucial to detect supernumerary teeth¹¹. The occlusal, periapical radiographies and orthopantomograph are essential for the diagnosis of the supernumerary, however due to superimposition of anatomical structures, supernumerary teeth may be overlooked on conventional radiographs. Cone Beam Computed Tomography (CBCT) can provide

precise and accurate information ,as they provide multi-planar imaging of dental tissues, and allows the identification of the position of the abnormalities and their proximity to important anatomical structures⁶.

Rao and Chidzonga¹⁵ claim that extraction should proceed only when the roots of adjacent teeth are fully developed. Omer **et al**⁶ carried out a study to identify the different changes and complications that can be produced in teeth adjacent to supernumerary teeth, in relation to the degree of root development at the moment of extraction of the supernumerary tooth, in order to determine the best time for extraction. They concluded that the therapeutic option that provokes the fewest complications is the surgical extirpation of unerupted supernumerary teeth when the permanent teeth are in formation stage C according to Demirjian. Another therapeutic option is to keep the supernumerary tooth under observation as long as it does not provoke any complication and does not interfere with function or aesthetics⁶

CONCLUSION

Multiple Impacted Supernumerary tooth in non syndromic patients is a rare phenomenon. Supernumerary teeth do not cause any complication,however, leads to delay or failure of eruption of permanent teeth, displacement, crowding, loss of vitality of adjacent teeth, pathological problems such as ameloblastomas, odontomas. The management of multiple supernumerary teeth throws a great challenge to clinicians. Therefore, it is important to initiate appropriate consultation and an interdisciplinary approach for the treatment. General anesthesia may be a burden to the patient due to anxiety and costs.

REFERENCES

1. Tereza GP, Carrara CF, Costa B. Tooth abnormalities of number and position in the permanent dentition of patients with complete bilateral cleft lip and palate. *Cleft Palate Craniofac J* 2010;47:247-52. <https://doi.org/10.1597/08-268.1>
2. Moore SR, Wilson DF, Kibble J. Sequential development of multiple supernumerary teeth in the mandibular premolar region – a radiographic case report. *Int J Paediatr Dent* 2002;12:143-5. <https://doi.org/10.1046/j.1365-263X.2002.00336>.
3. Luten JR. The prevalence of STin primary and mixed dentitions. *ASDC Journal of Dentistry for Children*. 1967;34:346-53.
4. Capozzi L, Gombos F, Masi P, Modica R, Valletta G. *Patologia speciale odontostomatologica*. Firenze, Italy: USES publisher. 1987
5. Cassetta M, Russomanno MR. L'iperdontia nei settori latero-posteriori; indagine epidemiologica su 20398 pazienti. *Riv Ital Stomatol*, 1994, 63 (11): 565-73
6. Orlando S., Bernardini U.D. Sulle anomalie dentali numeriche per eccesso. *Riv Ital Stomatol*, 1966, 21(12): 1267-1322.
7. Omer RS, Anthonappa RP, King NM. Determination of the optimum time for surgical removal of unerupted anterior supernumerary teeth. *Pediatr Dent* 2010;32:14-20.
8. Liu JF. Characteristics of premaxillary supernumerary teeth: a survey of 112 cases. *ASDC Journal of Dentistry for Children* 1995;62:262-5.
9. Sherrard JF, Rossouw PE, Benson BW, Carrillo R, Buschang PH. Accuracy and reliability of tooth and root lengths measured on cone-beam computed tomographs. *Am J Orthod Dentofacial Orthop* 2010;137(4):S100-S108. <https://doi.org/10.1016/j.ajodo.2009.03.040>
10. Thiago de Santana Santos, Erick Ricardo Silva, Ana Célia Faria, Francisco Veríssimo de Mello Filho, Samuel Porfírio Xavier, *Brazilian Dental Journal* (2014) 25(1): 79-82 <http://dx.doi.org/10.1590/0103-6440201301993>
11. Scanlan PJ, Hodges SJ. Supernumerary premolar teeth in siblings. *Br J Orthod*. 1997;24:297–300.
12. Brook AH. Dental anomalies of number, form and size: Their prevalence in British school children. *J Int Assoc Dent Child*. 1974;5:37–53.
13. Orhan AI, Ozer L, Orhan K. Familial occurrence of nonsyndromal multiple supernumerary teeth. A rare condition. *Angle Orthod*. 2006;76:891–7
14. C Ledesma-Montes; JF Salcido-García; F Hernández-Flores; M Garcés-Ortíz **J Clin Pediatr Dent** (2012) 37 (2): 193–197. <https://doi.org/10.17796/jcpd.37.2.n046705761353820>
15. Rao PV, Chidzonga MM. Supernumerary teeth: literature review. *Cent Afr J Med*. 2001;47:22–26.

MODIFIED WHALE'S TAIL TECHNIQUE WITH PRF FOR THE MANAGEMENT OF BONE-DEFECT IN ANTERIOR TEETH

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ABSTRACT

The purpose of this case report is to describe the modified Whale's tail technique to achieve primary closure and thereby aid in regeneration of an interdental osseous defect between maxillary central incisors. A 32 years old female patient with midline diastema reported in the department of Periodontology for regular check up and for oral prophylaxis. On clinical and radiographic evaluation there was a probing pocket depth of >10mm mesial

to left maxillary central incisors and an intrabony defect associated with the maxillary left incisors. A modified Whale's tail flap was employed to access the area. The defect was filled with an alloplastic graft and PRF[platelet rich fibrin] membrane. Six months postoperative review showed complete elimination of the pocket along with radiographic bone fill of the defect.

KEY WORDS - Platelet Rich Fibrin, Bone Defect, Papillae Preservation Flap

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INTRODUCTION

Periodontal regeneration is considered as the bed stone of periodontal treatment which is always been a challenge. Several treatment strategies has been employed like bone graft, barrier membrane, root biomodification , growth factors etc to attain periodontal regeneration. Studies have shown that bone graft along with barrier membrane facilitate considerable periodontal regeneration^[1] The

role of barrier membrane is to facilitate selective cell repopulation, space maintenance and also to initiate healing by stabilizing clot close to the root surface. Resorbable membranes are more acceptable because it avoid a second surgical opening. Several biological materials have been used as barrier membrane of which PRF is the latest in their lineage. It was found that graft along with PRF facilitate significant bone fill. [2]

graft along with barrier membrane, primary closure of the osseous defect is also essential to ensure predictable periodontal regeneration. Maximum gingival tissue should be preserved to ensure primary closure. Specific surgical technique like papillae preservation technique, modified papillae preservation technique, simplified papillae preservation technique has been employed to obtain primary closure along with preservation of interdental tissues.

Bianchi and Bassetti described, in 2009, a new surgical technique named Whale's tail technique that was designed to preserve interdental tissue in a wide infrabony defect in the esthetic zone. [1]

In this technique a large flap was elevated from the buccal side to the palatal side which allow access to the infra bony defect. This technique was used especially for GTR[guided tissue regeneration] while

maintaining the interdental tissue over the graft material.

CASE REPORT

A 32 years old female, healthy patient with midline diastema reported in the department of Periodontology for regular check up and for oral prophylaxis. On clinical evaluation there was a probing pocket depth of >10mm mesial to left maxillary central incisors (fig1)



Fig 1

The tooth had a Grade I mobility and clinical signs of trauma from occlusion were not evident. The remaining areas had no periodontal pocket. The oral hygiene status of the patient was good. OPG showed vertical bone loss in relation to the mesial aspect of maxillary left central incisor. [Fig 2]



Fig 2 Following an initial examination and treatment planning discussion, the patient was given detailed instructions regarding the surgical procedure and then subjected to non surgical therapy. After re evaluation of phase I therapy patient was subjected to surgical procedure. On adequate local anesthesia two semilunar incisions were made on both sides of the frenum. The medial extensions of both the semilunar incisions excised only the base of the frenal attachment, preserving the continuity of the flap [Figure 3].



Fig 3

The distal extensions of the incision were continued as intrasulcular incisions on the buccal, interdental and palatal aspect of the central incisors, separating the flap from the buccal attached gingiva and allowing the separation of a thick, broad papilla-preserving flap. The flap was elevated from the buccal to the palatal aspect visualizing the intra-osseous defect.

Debridement of the diseased granulation tissue, followed by thorough root planing and irrigation with normal saline was done. The required quantity of alloplastic graft material was transferred to a dappen dish, mixed with saline, and delivered into the osseous defect incrementally. The material was placed from the base of the defect coronally to the approximate level of the crest or the remaining osseous walls (fig 4)

Fig 4



Fig 5



Then the prepared PRF membrane was trimmed to adequate size and shape (fig 5) and was placed over the graft to serve as a barrier membrane. Afterwards flap was repositioned and sutured without tension and periodontal dressing was placed. Post surgical instructions were given. After 10 days sutures were removed and follow up was done at the end of one month and at the end of six months. After six months the site was free of inflammation and there was an attachment gain of 4mm with no recession.

Post operative radiograph showed complete filling of the defect.[Fig-6



Fig-6

DISCUSSION

It is always been a challenge for the periodontists to preserve the soft tissue as much as possible without apical migration of the gingival margins especially on anterior tooth. There were several surgical techniques like Papilla Preservation technique by Takei et al [3], Modified Papillae Preservation technique by Cortellini et al [4] and Simplified Papillae Preservation technique by Murphy et al [5]. All these techniques help to preserve the interdental papillae and interdental soft tissue to the maximum. Whales tail technique introduced by Besanchi and Bassatti is a new surgical technique indicated for the regeneration procedures on the anterior tooth with diastema. In this technique two vertical incisions were performed from the mucogingival line to the distal margin of the tooth neighboring the defect on the buccal

surface and a horizontal incision joined the vertical incisions at the apical aspect of the flap. This technique helps in preservation of large amount of soft tissues and primary flap closure which prevent flap dehiscence and the placement of sutures away from the graft margins prevent wicking effect.[6]

The surgical technique used in this case report is a modification of the Whales tail technique. In this technique vertical incisions are avoided and two semilunar incisions below the mucogingival line on the buccal surface were used. This helps in better approximation of the flap margins and better coverage of the PRF membrane.[6] The use of PRF aids in neovascularisation and regeneration. Studies have shown that the three dimensional structure of fibrin gel and the trapped cytokine in the fibrin mesh aids in angiogenesis and act as a chemotactic gradient for stem cells which helps in cell migration, differentiation and thereby promote regeneration and repair.[7] Patient compliance and plaque control are considerable factors in periodontal healing. Various treatment approaches are available for the management of intrabony defect. Modified whale's tail technique is a new approach to treat intrabony defect that preserves interdental soft tissue. The use of modified whale's tail technique along with

graft and PRF is an assuring treatment for intrabony defect on anterior tooth with diastema. Since there were only few studies that reported about Modified whales tail technique along with graft and PRF.

Further studies are needed to evaluate the long term result.

REFERANCE

1. Bianchi AE, Bassetti A. Flap design for guided tissue regeneration surgery in the esthetic zone: The “Whale’s tail” technique. *Int J Periodontics Restorative Dent* 2009;29:153-9.
2. Pradeep AR, Bajaj P, Rao NS, Agarwal E, Naik SB. Plateletrich fibrin combined with a porous hydroxyapatite graft for the treatment of three-wall intrabony defects in chronic periodontitis: a randomized controlled clinical trial. *J Periodontol* 2012, march 16
3. Takei HH, Han TJ, Carranza FA Jr, Kenney EB, Lekovic V. Flap technique for periodontal bone implants. Papilla preservation technique. *J Periodontol* 1985;56:204-10.
4. Cortellini P, Prato GP, Tonetti MS. The modified papilla preservation technique. A new surgical approach for interproximal regenerative procedures. *J Periodontol* 1995;66:261-6.
5. Murphy KG. Interproximal tissue maintenance in GTR procedures: Description of a surgical technique and 1-year reentry results. *Int J Periodontics Restorative Dent* 1996;16:463-77.
6. Anu Kuriakose, Majo Ambooken, Jayan Jacob, Priya John. Modified Whale’s tail technique for the management of bone-defect in anterior teeth. *Journal of Indian Society of Periodontology* 2015;19:103-106
7. Feng X, Clark RA, Galanakis D, Tonnesen MG. Fibrin and collagen differentially regulate human dermal microvascular endothelial cell integrins: Stabilization of alphav/beta3 mRNA by fibrin1. *J*

TOOTH POSITIONING IN COMPLETE DENTURE – AN OVER-VIEW.

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ABSTRACT

Precise tooth positioning in complete denture is crucial in achieving good stability and retention of complete dentures. Each individual has their own unique tooth positions where all the forces are equilibrated

This article describes the evolution of various concept of teeth arrangement in completely edentulous patients and clinical techniques to achieve better stability and retention of complete denture.

KEYWORDS: Neutral zone, Balanced Occlusion, Cuspal factors.

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INTRODUCTION

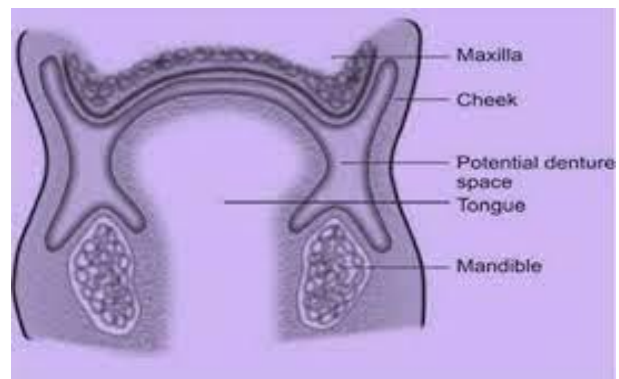
Tooth positioning concepts have been evolving since the origin of prosthodontics. Any deviation from ideal teeth arrangement may seriously affect the success of the prosthesis. The therapeutic challenges associated with designing complete dentures to optimally occupy the edentulous space are substantial to counter-act the aggressive and progressive changes that accompany edentulism.

HISTORY AND EVOLUTION

Weinberg introduced the concept of arranging teeth, so that buccal cusps and central fossae of mandibular posterior denture teeth should be arranged directly over the crest of the edentulous residual ridge. Later Pound introduced, “pound’s triangle”¹, where two lines originating from the mesial surface of the mandibular canine and extending posteriorly to the lingual and buccal aspects of the retro-molar pad forms a Triangle. Lammie rejected this concept and insisted to arrange posterior mandibular teeth over the buccal shelf to provide increased tongue space and to facilitate the development of vertical facial denture polished surfaces and better balanced occlusion, against which an effective facial seal can be achieved. The concept of Neutral zone set-aside all the previous concepts, which describes the unique individualized tooth position. This concept is found to be more logical than conventional mathematical approximations and arguments.

NEUTRAL ZONE

Neutral zone is defined as the potential space between lips and cheeks on one side and the tongue on the other that area or position where the forces between the tongue and cheeks or lips are equal². Complete dentures with teeth arranged in the theoretically stabilizing boundary conditions of Neutral zone, can be fabricated by careful molding of dynamic physiologic and functional nature of the complex stomatognathic system.



NEUTRAL ZONE SCHEMATIC REPRESENTATION

TECHNIQUE TO RECORD NEUTRAL ZONE

All the conventional procedures up to secondary impression should be done. After retrieving the master cast from mandibular impression, two record bases must be fabricated; one temporary record base using self-cure acrylic resin and other permanent using heat cure acrylic resin. The temporary

record bases can be modified to incorporate occlusal rims for recording maxillo-mandibular relationships. The permanent record bases are altered to record the Neutral Zone.³ Maxillo-mandibular relationships are recorded using occlusal rims on temporary record bases and articulated in Hanau wide-Vue articulator along with face-bow transfer and articulator programming.

RECORDING NEUTRAL ZONE

The permanent record bases must be evaluated in patient's mouth for stability and retention. The patient should be made comfortable in an upright position with the head supported. The vertical dimension on articulated casts was measured on mandibular occlusal rims. Retentive loops with no21 gauge stainless steel wires were incorporated to the permanent record base to provide mechanical aid in retention and to maintain the vertical dimension of the Neutral zone recording material. The green stick impression material and impression compound were taken in the ratio 7:3 and was softened in a 65⁰ C water bath⁴. The softened compound was kneaded and a roll was formed according to the crest and was attached to the base according to the pre-determined vertical dimension. Provide a cup of warm water to the patient and instruct the

patient to sip and swallow⁵. Tell the patient to say A, E, I, O, U. All these movements will mold the material to a definitive shape and form, which can be called as the Neutral Zone Record.

Once, the neutral zone record has cooled and hardened, remove and inspect the record for accuracy and completeness. Repeat the procedure to ensure proper recording of the entire neutral zone.

PREPARING NEUTRAL ZONE INDEX

Three widely placed notches are placed on Artistic portion of master cast. Seat the neutral zone record on the mandibular definitive cast. Mix putty consistency poly-vinyl-siloxane to a workable consistency and adapt it into the tongue space of the neutral zone record. Mold the putty so that it completely fills the tongue space; adapts accurately to the lingual contours of the neutral zone record and is level with the occlusal plane.

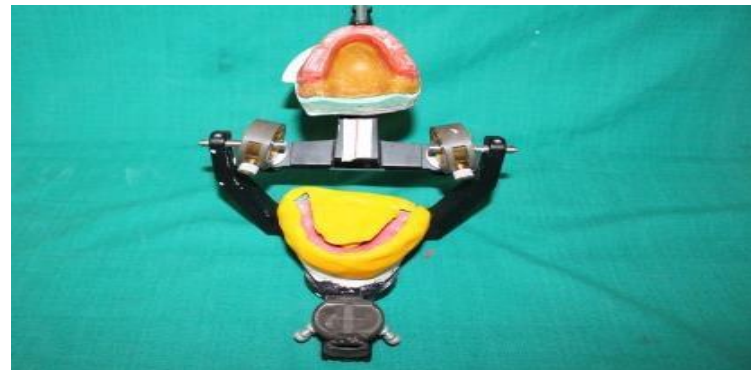
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NEUTRAL ZONE WITH PUTTY INDEX

The facial index can be developed by adapting a rope of laboratory putty consistency polyvinyl siloxane along the facial contours of the Neutral zone record so that it completely and accurately captures the facial contours of the neutral zone record and in level with the occlusal. After polymerization, remove both the lingual and facial indices and ensure that they can be replaced precisely. Remove the neutral zone record from permanent record base and place back the record base on to the master cast. Replace the lingual and facial putty index. Molten wax can be poured into the indices to form the occlusal rims according to neutral zone. Arrange the mandibular anterior teeth on the new record base so that desired relationships are established with the Maxillary anterior teeth .Arrange the mandibular posterior denture teeth so that all

posterior teeth contact the lingual index and all posterior teeth contact the desired occlusal plane template⁶. Complete the denture tooth arrangement by positioning maxillary teeth using conventional methods. The denture is processed using conventional methods



OCCLUSAL RIMS & TEETH ARRANGEMENTS IN NEUTRAL ZONE



DISCUSSION

The evolutionary concepts of teeth arrangements have historical significance in fabricating complete denture. Stability and retention are crucial factors for maintaining healthy stomatognathic system; especially in compromised edentulous conditions. Arranging tooth in precise location of previous natural tooth position seems to be more logical. Wright, Pound and Lammie introduced various mathematical and logical concepts of arranging artificial teeth. Neutral zone by definition is the area where the forces from cheek inward and tongue outward are neutralized⁷. The zone seems to be more precise and favorable for arranging artificial teeth on a complete denture, where stability is of utmost importance thereby avoiding unwanted lateral forces to preserve as much of remaining bone possible. The neutral zone recording can be made easy by admixed technique and creating putty index. Arranging teeth on to this space can virtually aids in un-interrupted functioning of oro-facial musculature.

CONCLUSION

Neutral Zone recording and arranging teeth give promising feature to enhance stability of dentures in compromised cases.

REFERENCES

1. Cagna et al, The neutral zone revisited: From historical concepts to modern application; J Prosthet Dent; 2009;101:405-412
2. Weinberg L. Tooth position in relation to the denture base foundation. The Journal of Prosthetic Dentistry. 1958;8(3):398-405.
3. Brill N, Tryde G, Cantor R. The dynamic nature of the lower denture space. J Prosthet Dent 1965;15:401-18.
4. Beresin VE, Schiesser FJ, editors. Neutral zone in complete and partial dentures. 2nd ed. St. Louis: Mosby; 1979. p. 15,73-108, 158-83.
5. Fahmi FM. The position of the neutral zone in relation to the alveolar ridge. J Prosthet Dent 1992;67:805-9.
6. Ries GE. The neutral zone as applied to oral and facial deformities. In: Neutral zone in complete and partial dentures. 2nd ed. Beresin VE, Schiesser FJ, editors. St. Louis: Mosby; 1978. p. 208-20.
7. Raybin NH. The polished surface of complete dentures. J Prosthet Dent 1963;13:236-9.

EVOLUTION OF DIGITAL IMPRESSIONS IN PROSTHODONTICS

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Abstract: Recording of the basal seat and surrounding teeth accurately is very crucial in dentistry. It is done previously by conventional impression materials like alginate, agar, elastomeric impression materials, but due to its demerits like gagging, unpleasant taste etc. newer methods like digital impressions and digital scanners have come into play. Digital scanners include a computer display and a hand-held wand with a camera to capture the

intraoral images in three dimensions. Digital impressions are more accurate, time saving and increases the comfort of patient compared to conventional impressions.

Keywords: Digital Impression, Itero, Lythos, Fast Scan, Plan Scan, True Definition, Trios, CEREC Omnicam , CEREC Bluecam, Apollo DI , CAD/CAM

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INTRODUCTION:

With the introduction of computers and its technology, it has taken dentistry to its advanced level¹. Digital dentistry, in particular, digital impressions have led to significant changes in impression making.

Conventional impression techniques have been used to register the teeth and surrounding soft tissues for many decades, but dimensional instability like volumetric

changes in impression materials and expansion of gypsum products etc, have posed a setback to these conventional techniques which sometimes takes lot of effort and time when the clinician has to remake the impression .²⁻⁴

To overcome these shortcomings, Intraoral scanner (IOS) was developed in the field of dentistry⁵. Currently, the combination of IOS and CAD/CAM have provided ease for laboratory communication, reduced chairside operator time, easier treatment planning, acceptance of case and final reduction in time of treatment.⁶⁻⁸

History and Evolution of digital impression systems

In 1856 Dr. Charles Stent used an impression material for fabrication of device under his name for correction of oral deformities.^{9,10} Sears¹¹ introduced agar impression material for crowns.

Condensation silicone was developed but the drawbacks were dimensional inaccuracy. With the introduction of polyvinyl siloxane, it rectified many of the problems like modulus of elasticity, dimensional accuracy, tear strength, poor odour, taste and superior flow.¹²

CAD/CAM (Computer Aided Design/Computer Assisted Manufacturing) had been used since 1960's in the manufacture of airplanes and automobiles. The first application of CAD/CAM in dentistry was by Dr. Francois Duret in 1970's in his thesis "Optical Impression".

In 1984, Duret invented and patented a CAD/CAM device and demonstrated the crown fabrication in 4 hours. In 1985, Dr. Mormann and Dr. Brandestini originated, the first profit oriented digital impression system the CEREC1, it is combination of a 3-dimensional (3D) digital scanner with a milling unit to create dental restorations from commercially available blocks of ceramic material in a single appointment.¹³

Dr. Mormann also licensed Sirona Systems. Cerec 2, cerec 3, cerec 3D were introduced in 1994, 2000 and 2003 respectively.

IOS technologies

IOS is composed of a camera that is handheld, computer and software. The goal is to record three-dimensional geometry of an object with precision.

STL (standard tessellation language) is the widely used digital format. Other formats include PLY files, polygon file format. After identification of POI (point of interest) software produces individual images or videos recorded by the camera under a light projection.¹⁴ Various Commercially available Scanning systems

1. iTero
2. Lythos
3. Fast scan
4. Plan scan
5. True definition
6. Trios
7. Carestream CS 3500
8. CEREC

Itero

Cadent inaugurated iTero in 2007. It utilizes confocal parallel scanning microscopy principle¹⁷. It mainly consists of computer monitor, scanner wand, mouse, foot pedal, keyboard and a mobile cart. Wand is bulky and large and in order to prevent crosscontamination disposable sleeves are used to cover the wand during the scanning procedure Technique

Quadrant wise scanning is done by holding wand at 45-degree angle to the margin of

gingiva starting at most distal of left lower buccal quadrant moving mesially recording both buccal and occlusal landscape. The same procedure is redone on the lingual side starting with the lower left lingual quadrant. The total time is 15 minutes.¹⁸ Recent advancements¹⁸:

1. iTero HD 2.9
2. iTero Element
3. iTero Element flex
4. iTero Element 2
5. iTero Element 5D

Lythos

Ormco corporation designed Lythos in 2013. It utilized Accordion fringe interferometry principle, specially designed for orthodontic purpose¹⁹. It is portable, with a touch screen, small well-designed wand, wireless internet connectivity and a disposable tip.

Technique

Scan is started by pointing wand tip on the occlusal surface and moving from left to right of lower arch followed by upper arch.¹⁷

Fast Scan

Glidewell laboratories, IOS Technologies launched Fast Scan in 2010. It

utilizes the active triangulation principle¹⁵. It is portable, with a touch screen and a large scanning wand.

Technique

In this system, the camera is moved along with the wand, and the wand is held in three positions (buccal, lingual and occlusal) to scan the full arch.

Plan scan

E4D Technologies introduced Plan scan in 2008. It utilizes optical coherent tomography principle.¹⁵ It has three removable tips, a cradle and a power cable. Planmeca software is used for data process and analysis.¹⁷

True definition

3M ESPE inaugurated True definition scanner in 2013. It utilized 3D in-motion video imaging technology.¹⁷ It consists of a touchscreen display, powder dispenser, lightweight metal wand, wireless internet connection.

Technique

Scanning is begun with the posterior occlusal surface of the first premolar. The scan was done in sextants, moving from lingual to buccal and finishing back on occlusal.²⁰

Trios

3Shape inaugurated Trios in 2010. It utilizes confocal microscopy principle.¹⁵

It is available as TRIOS cart which has smart multiscreen with 3D visualization and wifi connectivity, TRIOS chair integration with USB connection to computer display (laptop), computer screen, autoclavable tip, and anti-fog heater. It can auto fill the missing areas.²¹ Recent advancements:²¹

1. TRIOS 3 basic
2. TRIOS 3
3. TRIOS 4

CS 3500

Care stream dental inaugurated CS 3500 in 2013. It utilizes confocal microscopy principle. It is portable, without trolley, USB connection and consists of a wand.¹⁵

It requires no external heater to prevent fogging. Two scanning tips are present for adults and children.¹⁵

CEREC and Apollo systems

Sirona dental system introduced CEREC in 1987. It utilizes active triangulation and confocal microscopy principle^{22,23}

Currently three digital systems are available which include

1. CEREC Omnicam
2. CEREC Bluecam
3. Apollo DI

CEREC Omnicam produces full arch and half arch impressions with full color, 3D and 2D images. It has a small camera tip, handpiece with a rounded camera tube. The clearance between scanner and tooth must be 0 to 15 mm.¹⁵

CEREC Bluecam has a blue light-emitting diode for detail capturing. It can be used for scanning full jaw, quadrant and a single tooth. The camera is placed directly over the tooth. Apollo DI utilizes apollo DI software and apollo DI intraoral camera. These scans are black and white and the camera is moved 2-20mm over the tooth surface during scanning.¹⁵

Advantages of digital impression

1. Minimizes discomfort: Digital impressions by IOS minimizes the transient discomfort by the placement of impression materials and trays in the patient mouth.²⁴
2. It eliminates the use of impression trays, materials, etc.

3. Time-saving: Through the scanning of the patient's soft and hard tissues chairside time is reduced, moreover time-consuming procedures like pouring the casts etc. are eliminated.²⁶
4. Easier workflow: Procedure of impression is simplified for complex cases for instance severe undercuts, multiple implants which enable conventional impression procedure difficult, and the procedure for repeating the impression is easier without remaking the entire procedure^{27,28}
5. Communication with laboratory personnel: IOS enables the clinician to communicate with the laboratory personnel instantaneously after the scan,^{24,27,28}
6. Improved patient relationship: With the advent of IOS the relationship between the clinician and the patient was improved and the patient is more involved in the workflow and has a positive outcome on overall treatment^{24,27,28}

Disadvantages of digital impression

1. Sub-gingival margin detection: There was a problem of scanning of deeply placed gingival margins
2. IOS scanning is a troublesome in case of bleeding as it may conceal the prosthetic margins and makes the scan inaccurate and disrupted.²⁹
3. IOS cannot displace the soft tissue margins and cannot register dynamic tissue relationships³⁰
4. Learning curve: Learning curve adaptation for IOS is difficult for older clinicians with less desire and experience with computers and technology³¹
5. Cost-sensitive: The initial purchase costs of IOS are very high, even after the release of many new models into the market^{24,29}
6. Additional managing costs like software upgradation, etc were also present.
7. Laboratory personnel also must be familiar with digital workflow

Clinical Implications

IOS is utilized in various fields of dentistry, mainly in prosthodontics to make impressions of prepared tooth for inlays, onlays, single crowns which include zirconia, lithium disilicate, a framework for fixed partial dentures, provisional restorations for fixed bridges and implants, partial removable dentures, post and core, digital smile design, obturators, surgical guide for placement of implants.³²

IOS is not recommended for long-span fixed partial dentures or fixed full arches, long span implant-supported fixed partial or full arches and Completely removable Prosthesis. In orthodontics for diagnosis and treatment planning, aligner fabrication and in Invisalign system.³²

Conclusion

IOS have many advantages over conventional impression procedure, they improve patient as well as operator comfort, reduces the number of visits and improves practice efficiency of the operator. Due to its undeniable benefits, intraoral scanning will be a routine dental procedure in the near future era.

References

1. Lands B. The accuracy and reliability of plaster vs digital study models: A comparison of three different impression materials; 2010.
2. Beuer F, Schweiger J, Edelhoff D (2008) Digital dentistry: an overview of recent developments for CAD/CAM generated restorations. *Br Dent J* 204, 505-511.
3. Miyazaki T, Hotta Y, Kunii J, Kuriyama S, Tamaki Y (2009) A review of dental CAD/CAM: current status and future perspectives from 20 years of experience. *Dent Mater J* 28, 44-56.
4. Ender A, Mehl A (2011) Full arch scans: conventional versus digital impressions--an in-vitro study. *Int J Comput Dent* 14, 11-21
5. Commer P, Bourauel C, Maier K, Jager A. Construction and testing of a computer-based intraoral laser scanner for determining tooth positions. *Med Eng Phys*. 2000;22(9):625-35.
6. Ender A, Mehl A (2015) In-vitro evaluation of the accuracy of conventional and digital methods of obtaining full-arch dental impressions. *Quintessence Int* 46
7. Mehl A, Ender A, Mormann W, Attin T. Accuracy testing of a new intraoral 3D camera. *Int J Comput Dent*. 2009;12(1):11-28.
8. Garino BGF. The Ortho CAD iOC intraoral scanner: a six-month user report. *J Clin Orthod*. 2011;45(3):161-4.
9. Cuperus AMR, Harms MC, Rangel FA, Bronkhorst EM, Schols JGJH, Breuning KH, et al. Dental models made with an intraoral scanner: A validation study. *Am J Orthod Dentofacial Orthop*. 2012;142(3):308-13.
10. Guerini V. A History of Dentistry; 1909. p. 305-306
11. Bremner MDK. The Story of Dentistry. New York & London: Dental Items of Interest Pub Co., Inc; 1958
12. Jacobson B. Taking the headache out of impressions. *Dent Today*. 2007; 26:74-6
13. Jacobson B. Taking the headache out of impressions. *Dent Today*. 2007; 26:74-6.
14. Baheti MJ, Soni UN, Gharat NV, Mahagaonkar P, Khokhani R, Dash S, et al. Intraoral Scanners: A New Eye in Dentistry. *Austin J Orthopade Rheumatol*. 2015;2(3):1021.
15. www.aegisdentalnetwork.com/ida/2014/10/the-transition-to-digital-dentistry
16. Richert R. Intraoral Scanner Technologies: A Review to Make a Successful Impression. *J Healthc Eng*. 2017; 2017:8427595.
17. Logozzo S, Zanetti EM, Franceschini G, Kilpela A, Mäkitäinen A. Recent advances in dental optics – Part I: 3D intraoral scanners for restorative dentistry. *Opt Lasers Eng*. 2014; 54:203-21
18. Duret F, Pelissier B. Différentes méthodes d’empreinte en CFAO dentaire. In: *Medecine Buccale*. Elsevier Masson SAS; 2010. p. 1-16.
19. Kravitz ND, Groth C, Jones PE, Graham JW, Redmond WR. Intraoral digital scanners. *J Clin Orthod*. 2014; 48:337-47
20. iTero: Intra Oral Digital Scanner. <http://itero.com/>.
21. Lythos Digital Impression System. <http://www.ormco.com/products/lythos/>.
22. Digital Impressions: 3MTM True Definition Scanner. Available from: http://solutions.3m.com/wps/portal/3M/en_US/3M-ESPE-NA/dentalprofessionals/products/category/digital-materials/true-definitionsscanner/.
23. 3Shape Orthodontics. <http://www.3shapedental.com/orthodontics.asp>
24. Brandestini M, Moermann WH. Method and apparatus for the three-dimensional registration and display of prepared teeth. US Patent. 1989; p. 4837732.
25. Schwotzer A. Measuring device and method that operates according to the basic principles of confocal microscopy, US Patent; 2007.
26. Imburgia M, Logozzo S, Hauschild U, Veronesi G, Mangano C, Mangano FG, et al. Accuracy of four intraoral scanners in oral implantology: a comparative in vitro study. *BMC Oral Health*. 2017;17(1):92.
27. Ahlholm P, Sipila K, Vallittu P, Jakonen M, Kotiranta U. Digital Versus Conventional Impressions in Fixed Prosthodontics: A Review. *J Prosthodont*. 2018;27(1):35-41.
28. Burhardt L, Livas C, Kerdijs W, van der Meer WJ, Ren Y. Treatment comfort, time perception, and preference for conventional and digital impression techniques: A comparative study in young patients. *Am J Orthod Dentofac Orthop*. 2016;150(2):261-7.
29. Goracci C, Franchi L, Vichi A, Ferrari M. Accuracy, reliability, and efficiency of intraoral scanners for full-arch impressions: a systematic review of the clinical evidence. *Eur J Orthod*. 2016;38(4):422-8.
30. Lee SJ, Gallucci GO. Digital vs. conventional implant impressions: efficiency. *Clin Oral Implants Res*. 2013;24(1):111-5.
31. Zimmermann M, Mehl A, Mormann WH, Reich S. Intraoral scanning systems - a current overview. *Int J Comput Dent*. 2015;18(2):101-29.
32. Lim JH, Park JM, Kim M, Heo SJ, Myung JY. Comparison of digital intraoral scanner reproducibility and image trueness considering repetitive experience. *J Prosthet Dent*. 2017;
33. Agnini A, Agnini A, Coachman C. Quintessence Publishing. 2015
34. Mangano F. Intraoral scanners in dentistry : a review of current literature. *BMC Oral Health*. 2017;17:149-149.

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