

# Four Handed Dentistry: An Indispensable Part for Efficient Clinical Practice

Deepak Ranjan Dalai<sup>1</sup>, D. J. Bhaskar<sup>2</sup>, Chandan Agali R.<sup>3</sup>, Vipul Gupta<sup>4</sup>, Nisha Singh<sup>5</sup>, Swapnil S. Bumb<sup>6</sup>

<sup>1,5,6</sup> Post Graduate Student, <sup>2</sup> Professor & Head <sup>3</sup> Reader, <sup>4</sup> Senior Lecturer

<sup>1,2,3,4,6</sup> Department of Public Health Dentistry, Teerthanker Mahaveer Dental College and Research Centre, Moradabad, India

<sup>5</sup> Department of Pedodontics and Preventive Dentistry, Buddha Dental College and Hospital, Patna, India.

**Corresponding Author:** Dr. Deepak Ranjan Dalai, Department of Public Health Dentistry, Teerthanker Mahaveer Dental College and Research Centre, Moradabad, India. **Email id:** drdpakdalai@gmail.com

## Abstract

Now a day's dentistry is integrated with a vast amount of newer technology. However the stress on the dental team is still same. In order to facilitate much safety, smooth and convenient procedure it is needed to modify the concept of four handed dentistry and need to be implemented in the practice. The knowledge about the same is needed to be improved in young dentist to improve the ergonomics. The co-ordination in between the dentist and the assisting team is the key factor to achieve good practice, sterilization and also to conserve the time during the procedure. All these particular things can be achieved by incorporating & improving the four handed dentistry in practice. This article aims in making the young dental professionals and clinical practitioners in becoming acquainted with the concepts of four handed dentistry and the ways in which they can apply the current technology in the modern dental office.

**Keywords:** Dental auxiliary, Dental practice, Ergonomics

## Introduction:

Glenn Robinson in 1968, summarised the concept of four-handed dentistry: four handed dentistry involves the coordinated work of both the dentist and assistant, working as a team to perform those operations in a manner that has been carefully and deliberately planned.

The term "Four handed dentistry" was first recorded in the proceedings of a conference on "training dental students to use chair side assistants" in 1960. Since then, this term has been widely used. It involves the use of a trained, competent, chair side assistant to work constantly with the dentist in performing the technical procedure during the course of any dental procedure in the dental set-up.<sup>1</sup>

Four handed dentistry involves a vigilant study of all steps of office management to save time and

minimise stress associated with the practice of any form of conventional dentistry. It implies that the dentist will discharge those obligations that only he can legally do and that he will assign all other tasks to auxiliary personnel. It implies the use of the most modern dental equipment which has been carefully selected and arranged for convenient operation. The performance of four handed dentistry requires certain basic elements for it to be effective such as selection of equipment. Selection and development of techniques should be directed towards maximum operating efficiency. Operating equipment that will facilitate four handed dentistry should be selected with care and arranged for the convenience of both the assistant and the operator. Regardless of which configuration is selected, the end result should be such that both the operator and the assistant gain access and

visibility during any procedure while maintaining comfort throughout the work day.<sup>2</sup>

### Principles of four-handed dentistry:

The use of dental auxiliaries is now considered as a crucial part of dentistry. It has become increasingly evident that an aptly trained dental assistant is as important as dental tools in a clinical set-up. Effective utilisation of an extra pair of hands provided by the trained assistant in a four-handed sit-down dentistry situation is generally accepted as an ideal method of delivering dental services.<sup>3</sup>

This concept of delivering dental services consists of four basic principles:

1. Any sort of operation being done in a seated position.
2. Utilizing the skills if the dental assistant is skilled.
3. Organising every component of the practice.
4. Simplifying all tasks to the maximum.

### Basic tenets of four-handed dentistry:

Due to the use of inappropriate equipments and technologies, some dentists and assistants claim of suffering from physical stress. Dentists can still be observed changing their own burs, or twisting and turning to reach equipment on their side of the chair. True four handed dentistry is considered not followed if the assistant does not remain in charge of all instruments transfer. It is based on a set of criteria that define the conditions under which efficiency can be attained. To practice true fourhanded dentistry, the following criteria must be met:<sup>4</sup>

1. To minimize unnecessary motion, equipment's must be ergonomically designed.
2. Both the operating team and the patient should be comfortably seated
3. Practice of motion economy should be done.
4. Pre-set cassettes/trays are utilized.
5. The dentist assigns all legally delegable duties to qualified auxiliaries based on the state's guidelines.
6. Treatment Plan of the patient is designed in advance in a logical sequence.

### Zones of activity:

All treatment activity generally revolves around the patient. The dental team should be aware about the spatial relationships around the patient at chair side. The work area around the patient is divided into four "zones of activity". Zones of activity are identified using the patient's face as the face of a clock.

The four zones are:

- a) Operator's zone,
- b) Assistant's zone,
- c) Transfer zone,
- d) Static zone.

The operator's zone for a right-handed operator extends from 7 to 12 o'clock, the assistant's zone from 2 to 4 o'clock, the instrument transfer zone from 4 to 7 o'clock, and the static zone from 12 to 2 o'clock. The operator changes position depending upon the dental arch and tooth being treated. The assistant rarely moves much in the zone of activity, but may find it necessary to raise the operating stool when working on the mandibular arch to improve the line of sight into the oral cavity. These zones are self-explanatory except for the static zone, which is the zone of least activity. Instruments that are infrequently used such as the blood pressure equipment, portable curing light, or the assistant's mobile cabinet when not in use can be stored in this area.<sup>5</sup>

### Strategies to ensure effective fourhanded dentistry:

#### a) Teamwork:

For effective application of true four handed dentistry each member of the dental team must assume personal as well as team responsibilities. The team must be aware of each other's needs, recognize the need to reposition the patient and operating team, as necessary, to reduce strain, improve access and visibility, and reduce unnecessary movement by transferring instruments only within the transfer zone.

#### b) Strategies for the Operator:

For basic dental procedures, a standardised routine must be followed involving a non-verbal

signal during exchange of instruments and when necessary a distinct verbal direction to communicate. The dentist/ operator must be willing to accept input from the assistant as it is noted that chair positions need to be adjusted.

### c) Strategies for the Dental Assistant

The clinical assistant must develop a thorough understanding of the procedure, recognize the patient's needs, anticipate the operator's need, and recognize any change in the procedure. During the procedure the assistant should be seated as close to the patient as possible with legs parallel to the long axis of the patient's body. The assistant must be alert to changes in position of the dentist and determine a non-verbal signal to indicate to him or her that chair positioning needs to be improved.<sup>6,7</sup>

### Equipment setup design:

The basic dental unit designs available today include the side delivery, rear delivery, split unit/cabinet, and transthorax.<sup>8</sup>

#### a) Transthorax Delivery

This type of set-up delivers the most effective and efficient four-handed dentistry. The Transthorax unit design, while encouraging favourable ergonomics, meets the requirements of favourable time and motion. Here, the dental unit is positioned over the thoracic area of the patient which aids the dental assistant in retrieving the hand pieces and transferring them to the operator. This eliminates the shift of the operator's vision away from the operating site.

#### b) Side Delivery

This unit has been a popular concept for many decades. The units in this type of setup include a cuspidor which intervenes with the position of the assistant and creates an insecure infection control system as well as proves a difficult task to the patient if actually used. This type of setup forces the operator to retrieve and replace the headpiece by self, which forces the shift of vision from the field of work and also involves twisting of the upper body to grasp the required instrument and then refocus the eyes on the

operative field. This results in fatigue of eyes and physical stress.

#### c) Rear Delivery

With this type of set-up, the operator has to retrieve and replace the hand pieces. In this type of setup the operator has to shift his/her focus from the operating field to pick up the hand piece, as a result of which the operator suffers from strain and moreover this setup requires frequent twisting and turning. It is often necessary to transfer the hand piece from the retrieval hand to the operating hand in order to use it. The units are mounted in a fixed position that cannot be moved to accommodate for the changing working positions of the operator or for ease of use for the assistant.

#### d) Split Unit/Cabinet

This unit places a part of dental unit on the operator's side and the air/water syringe on the assistant's mobile cabinet. As in the side delivery unit, it requires the dentist to retrieve the hand pieces and makes them inaccessible during operatory procedures.

### Team responsibilities during instrument transfer:

#### Basic Principles<sup>9</sup>

Successful instrument transfer plays an important role and requires prior organization and planning which can be done by well defining the treatment plan so that the instruments and material which are required can be gathered in advance to procedure. Placing the patient in a correct position improves access and visibility, instrument should be placed within 21 inches of the assistant radius. While performing surgical procedure, placement of instrument over patient's chest conserve the time and improves the motion. To achieve successful instrument transfer, each member must assume specific and related responsibilities.

### Operator Requirements

Maximum efficiency can be achieved by maintaining the finger rest in the oral cavity by operator and another hand can be used for instrument transfer actual location of this should be predictable to team members. Such kind of predictability is necessary for smooth and safe transfer of the instruments. To avoid the repetitious verbal communication a non-verbal signal needed to be indicated to make the procedure silent and simplified. Non-verbal withdrawal of the used instrument can facilitate the better access and also to maintain concentration at the site of procedure.

### Assistant Requirements<sup>10</sup>

Assistant should arrange all the instrument in an instrument tray or in a cassette in the sequence of use to facilitate the rapid transfer of the instrument during procedure. The assistant should stay alert for any change in the procedure and reorder the instrument according to same.

### Team Requirements

For the purpose of safety it is advisable that the team should look after the patient movements and also towards the sharp and anaesthetic instruments in order to avoid any kind of mishap during or after surgery.

### Instrument Grasps

- a) **Pen grasp:** it resembles the position most commonly used to hold a pen and it is widely used for most of the operative instruments
- b) **The modified pen grasp:** It is similar to the pen grasp except the operator uses the pad of the middle finger on the handle of the instrument. This method provides more strength and stability.
- c) **The palm grasp:** It is used for bulky instruments most commonly used for surgical forceps, rubber damp clamp forceps, straight chisels and the air/water syringe.
- d) **The palm-thumb:** It is used by the assistant for holding the oral evacuator.

### Types of Instrument Transfer

The three most common instrument transfers used today in dentistry are the single-handed, two-handed, and hidden syringe transfers.

#### Single-Handed Transfer Technique (Right-handed operator)

It is used during most common treatment procedures. Procedure involves transfer of the instruments with the left hand and holding the oral evacuator tip and air/water syringe with right hand. While working with a left-handed operator, all the positions get vice versa.

#### The Single-Handed Transfer<sup>11</sup>

This type of instrument transfer for right-handed operator is illustrated in the following procedural outline.

- Gather instruments in sequence of use
- place the instrument tray as near to the patient as possible
- Place auxiliary equipment such as the anaesthetic syringe, or rubber dam farthest from the reach of the patient.
- At the beginning, simultaneously pass the mouth mirror with the right and the explorer with the left hand.
- Pick up the instrument to be transferred in the left hand and position it between the first finger and thumb at the non-working third of the instrument.
- Rest the instrument on the middle finger, making certain that the working end is positioned for the correct arch and position it within 10-12 inches from the operator's hand in readiness for a transfer when needed.
- The operator signals for an exchange by moving the instrument being used from the 2010 until it is above the first knuckle. Take care to avoid puncturing the gloves.

#### The Two-Handed Transfer

It is used when transferring bulky instruments such as surgical forceps or elevators. The assistant pick up the used instrument with one hand and deliver

the new with the opposite hand. It requires more movement and limits the use of the high volume suction.

### Use of Non-Locking Tissue Forceps

If non-locking forceps are used, care should be taken to ensure the beaks do not separate during transfer. After the material to be transferred has been placed into the forceps beaks the forceps are paralleled with the used instrument that is to be exchanged. It is exchanged in the same manner as other instruments. While returning to the assistant, the working end of the forceps should be grasped in the palm of the hand to eliminate dropping the contents.

### Delivery of Small Items<sup>12</sup>

Cotton applicator and other small items can be handed over to the operator like other instruments. For easy access to the operator, medicaments can be passed by first passing the insertion instrument and then holding the pad with medicament in the transfer zone.

### Delivery of Scissors

For the exchange of scissors with other instruments, the assistant with the left hand first picks up the scissors from the tray; opens the handles a bit and parallels the scissors with the instrument to be exchanged. The operator modifying the hand position places the thumb and first or second finger into the rings of the handle. Concern is taken while the scissors are returned. The beaks of the Scissor should point towards the assistant.

### Six Handed Transfer

High powered microscope used in complex endodontic surgeries require handling by both the dentist and assistant for greater and precise visibility. In this case, a third set of hands becomes essential in retraction and preparation of materials. While the first clinical assistant remains engaged in the treatment on the operation site, the second clinical assistant anticipates the needs of both the operator and the primary assistant.

### Conclusion:

Number of studies from various literatures conducted on the effects of chair side assistants on the productivity of the routine dental practice have showed a positive result. An increase in productivity, ranging from 33%-75% has been demonstrated. Proper training; both practical and theoretical has to be imparted to the chair side assistants to make four handed dentistry more effective.

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