

What is the appropriate location and position of a handpiece?

People don't pay much attention to where high-speed and low-speed handpieces should be located before, during and after an operation, or in what position they should be. However, this is very important.

The precise location and position of frequently used instruments such as handpieces have a great influence on the efficiency of a dental practice.

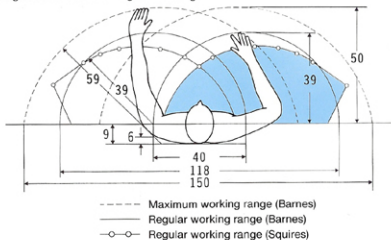
If we determined how frequently the operator picks up a handpiece in one day, we could easily understand that if a handpiece is in the wrong location and at the wrong angle, it would create a lot of wasted movements and lower the efficiency of a dental practice. Therefore, it is important to base the location and position of a handpiece on human engineering research.

1. The operator's right hand as the basis for handpiece location and angle

The basis for determining the location and position of the handpiece is the operator's right hand and forearm.

According to the study by Dr. Barnes and Squires, et al., the human hand has a given range of movement. He named this range of movement a "regular working

range". (cf. Fig. 1) When a handpiece is within this range, the operator can pick it up and put it back on the table, easily. If the handpiece is outside this range, the operator must extend his hand or twist his torso to reach the handpiece. Hence, it can be said that a very important point to consider when selecting the patient support is that the handpiece will be within this regular working range.



The blue zone indicates the regular working range of the right hand. It is desirable that the patient's mouth and a handpiece are located in this range. (Quoted from Barnes and Squires** description of the regular working range.)



2. How to determine the location, angle and direction

It is also important to check the location, angle and direction of a handpiece that is placed in the regular working range.

The appropriate basis for determining the location, angle and direction of a handpiece is the natural movement of the operator's hands. People often unconsciously return a hand-held object to the table in the position and at the angle where they can easily pick it up again. For instance, if we closely observe the way a pencil or a ball-point pen is placed on the desk in our daily life, we can find the same tendency.

There are 4 ways to pick up hand-held instruments: (cf. p.10)

- 1) with the fingers,
- 2) with the fingertips,
- 3) with the hand and fingers,
- 4) the instrument is handed to the operator by another person.

When picking up an instrument with a hose, such as a handpiece, the first method is the most desirable. If a handpiece can be picked up and placed at the operating point, without changing the grip, repeated use becomes very easy. (cf. Fig. 1) In principle, a handpiece should be located, angled and directed so that the operator does not have to turn his eyes toward the handpiece, but can continue to

give attention to the operating point during pick up. This is an important checkpoint in handpiece specification.

Examples of the wrong location, angle and direction of a handpiece are shown in the pictures on the right. Please note the inappropriate direction of the operator's sightline, as well as the unstable and unnatural posture of the torso, hand and forearm. (cf. Fig. 2 and 3).

