



The use of the modified pen grip by dentists and dental hygienists.

In most cases a dentist or dental hygienist is using the pen grip for instrument manipulation, sometimes the palm grip.

The *palm grip* is a power grip, by which the instrument is positioned in the palm of the hand. The four fingers are bent around the instrument from one side, the thumb from the other side

The *normal pen grip*, by which a pen is held between the tips of the thumb and forefinger and the lateral side of the distal (last) phalanx of the middle finger, is also used for handling dental instruments. But this grip is unsuitable for use by dentists and dental hygienists. Because the used pinch grip requires much force of muscles of hand and upper arm while stability and flexibility are low as a consequence of using the middle finger for both holding the instrument and supporting the hand. As the third finger is more or less fixed many movements have to be made in the wrist, causing often unfavourable positions such as e.g. an extensive palmar flexion. It is understandable that the use of the normal pen grip can give rise to CANS (complaints of arms, neck and shoulders), formerly called RSI.

The *modified pen grip* is a precision grip dentists have to use for the micromanipulation with dental instruments.

For the modified pen grip the first three fingers, thumb, forefinger and middle finger, are positioned with the tips of the fingers against the instrument while the phalanxes are bent.

The thumb and forefinger are positioned across from each other and the middle finger is located closer to the working end of the instrument.

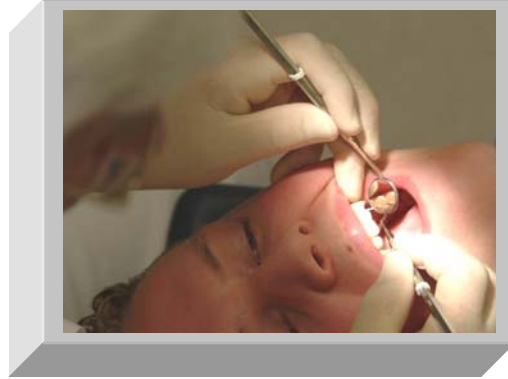
The fingers have to be bent around the instrument and not stretched lying parallel to the instrument because the strength is then 50 % less.

For an optimum load of the muscles etc instruments with a shaft thickness of 7.5 mm or more are necessary, also for tactile instruments

For supporting the hand the ring finger and little finger are used and positioned on a firm surface. With both fingers in the mouth (dental arch or jaw), one finger in the mouth and one extra-orally or both fingers extra-orally (on the chin or cheek supported by a bony layer). Sometimes a finger from the not working hand is used to form a supporting basis.

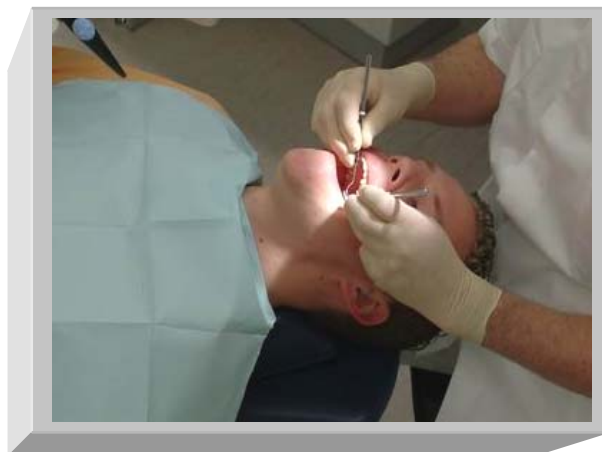
By using two fingers more stability for supporting the hand and the weight of the lower arm can be obtained

When possible the ball of the hands is positioned on the cheekbone to enlarge the stability.



The *advantages of the use of the modified pen grip* compared with the normal pen grip are the following.

1. An optimal load distribution because the strength is applied by three fingers bent around the instrument instead of two fingers. The pressure on ligaments, joints etc is less in this way
2. The strength is four times greater than the strength possible with the pinch grip of the normal pen grip; and two times greater than when using 3 stretched fingers, lying parallel to the instrument, for holding the instrument.
3. More stability by using 2 separate fingers for supporting the hand instead of one finger used for both holding and supporting the instrument.
4. More flexibility as the 3 first fingers can move separately from the support of the hand and the modified pen grip enables the dentists to roll the instrument precisely between the tips of the forefinger and the thumb, while the middle finger adapts the angle.
5. These advantages make it possible to obtain support for the fourth and fifth finger at a greater distance from the working/operating field providing a better survey and possibility for lighting of this
6. No pressure is exerted on the lateral side of the distal phalanx of the middle finger, which may lead to deformations (osteoarthritis).



For an adequate manipulation of instruments the following is important.

1. Avoiding extreme movements. The required movements can be obtained with the fingers, small movements of the wrist and lower arm and when necessary by small movements of the upper arm.
2. Minimizing the force of the grip as much as possible. Too much strength results in a poor blood circulation in the fingers and tension of the muscles of the upper arm.
3. Positioning both hands symmetrical to each other to achieve a symmetrical posture.

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