Dental Clinical Ergonomics

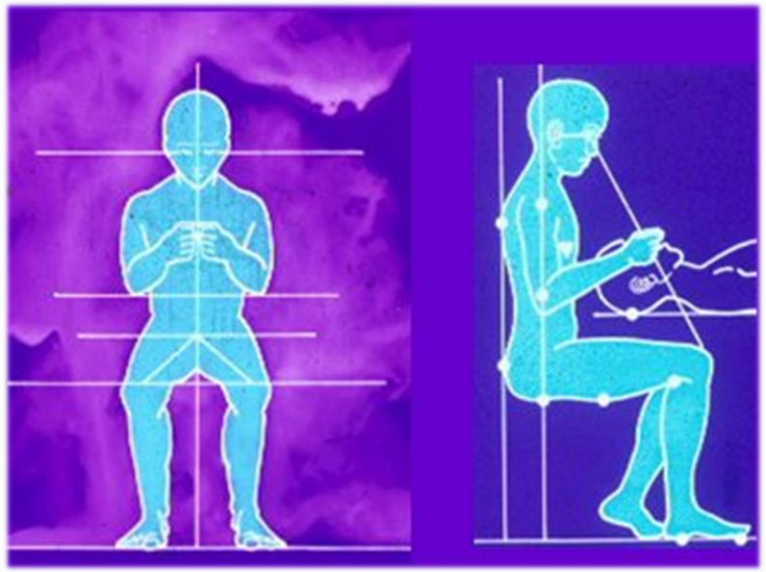
Study module resource

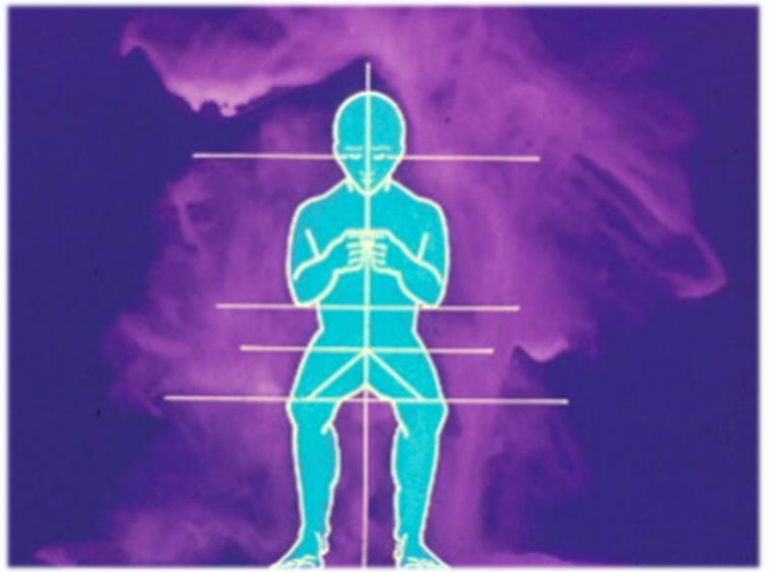
2. Postural Self-Derivation

Source: UBC Faculty of Dentistry

To perform fine motor activity typically done in clinical dentistry

- The oral cavity needs to be brought to an **Optimal Control Point** which is approximately at the clinicians' heart height and in the mid-saggital plane of the clinicians' body.





To perform fine motor activity typically done in clinical dentistry

- Clinicians will also need to choose some sort of hand stabilization (hand rests) to optimize control of the hands for fine activity.
- Both elbows will be resting lightly at the clinicians' sides during most phases of operation.

To perform fine motor activity typically done in clinical dentistry

- **Any** compromises of these parameters are unacceptable for your musculoskeletal health.
- These are usually the results of:
  - Inappropriate equipment layouts,
  - Poor choices in equipment use,
  - Limiting habits (muscle-memory sets), and/or
  - Limiting assumptions about how any given procedure can be performed.

To perform fine motor activity typically done in clinical dentistry

- **Balanced Operating Position** determined by you in **free-space** will look like this:

Three phases to deriving a BOP

1. Find your balanced operating position and your optimal control point.
2. Adjust the patient chair to bring the patient's oral cavity to your optimal control point.
3. Adjust the other equipment in the operatory to support your balanced operating position.

1. Find your balanced operating position and your optimal control point

- Best determined by:

- First close your eyes and relax your muscles.
- Sit in free space (not leaning against the backrest) on your operator stool.

1. Find your balanced operating position and your optimal control point

- Adjust the height of the stool until it feels comfortable.
- Take time to explore the full range of options and focus on how your body feels.
- In most cases, individuals will select a chair position in which the seat pan is adjacent to the mid-point of the head of the fibula, located at the lower half of the kneecap.

1. Find your balanced operating position and your optimal control point

- With arms resting at your sides:

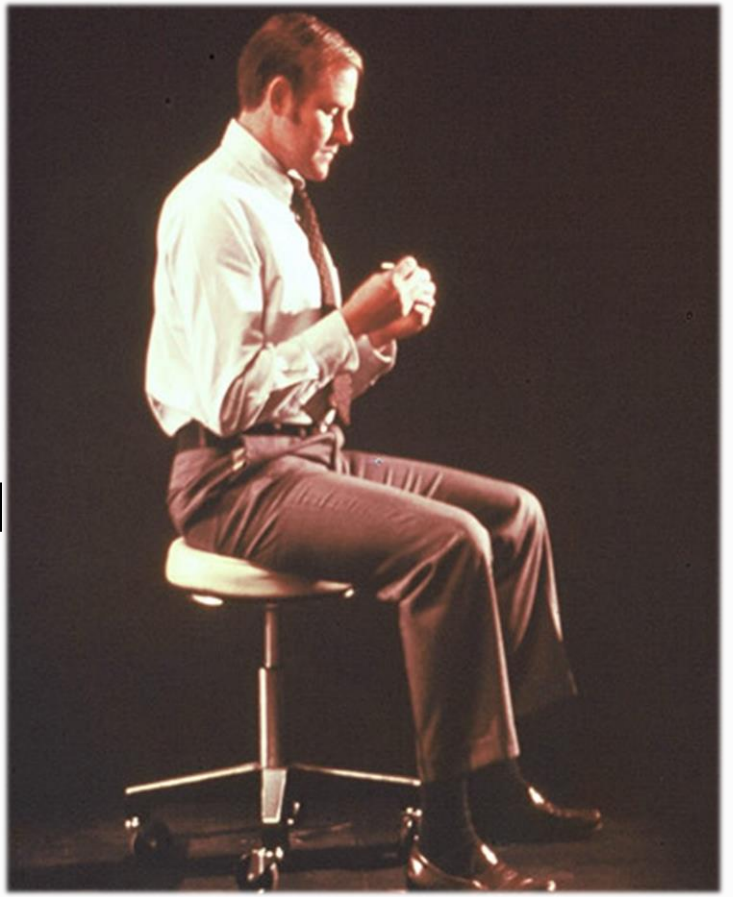
- Explore the options for your upper body, by moving your upper body back and forth and side-to-side to investigate to find the most comfortable position.

1. Find your balanced operating position and your optimal control point

- Explore in the same way (forward and backward, left and right) to find a comfortable position for your head.
- With your elbows still hanging loosely at your sides and your eyes closed, bring your thumbs and index fingers together, as if you were holding a needle or doing some other fine psychomotor skill.
- Raise your hands to the position you would prefer for this type of work **if vision were not an issue.**

1. Find your balanced operating position and your optimal control point

- In a clinical situation, you will likely choose to stabilize your hand on intra- or extra-oral tissues.
- If you don't bear this in mind, you might try to compensate for the strain of supporting the weight of your own forearms and hands and choose a working position which is too low.
- Now open your eyes and observe the location of your fingers (the Optimal Control Point).



1. Find your balanced operating position and your optimal control point

- Your fingertips will need to be at least 7” to 9” from your chest to accommodate the head of the patient.
- If you cannot easily see your fingers, decide whether to move your hands (thereby moving your Optimal Control Point) or tilt your head forward slightly.
- You will probably need to raise and lower your head to explore the balance between strain to your eyes and strain to the musculature of the head and neck.

1. Find your balanced operating position and your optimal control point

- Maintaining visual contact of the Optimal Control Point:
  - When you find the point where both of these two groups of muscles (eyes and head/neck) are the least strained, you have identified the optimal head position for clinical treatment.

- If you have worked through these steps and carefully relied on your internal feedback, the position you have selected will represent your optimal working position.

- This is also the position that will serve as a reference to select surgical telescopes, especially with respect to declination angle.

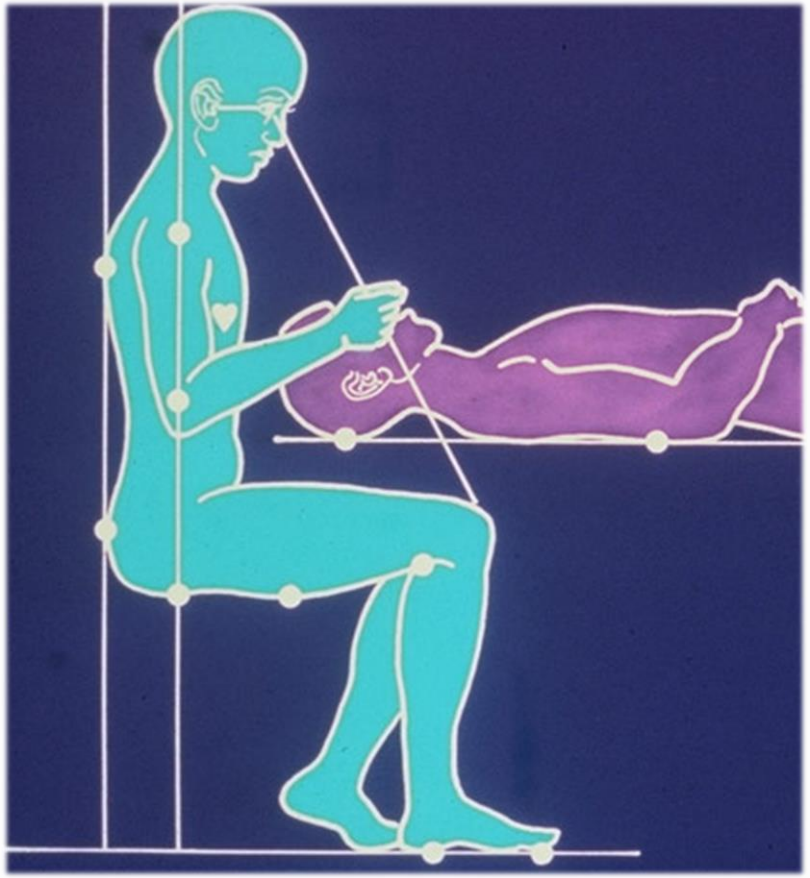
1. Find your balanced operating position and your optimal control point

- Optimal BOP may not necessarily be the posture in which you currently work, but it should be the posture that allows your muscles to be balanced and relaxed.

- The lateral profile of a balanced seated position is usually a level line or a slightly downward sloping line from the seat bones to the outer bony eminence at the knee (yellow line).
- The more easily observed top profile of the thighs (red curved line) tells you little, and its use as a guide to positioning has long been associated with a too-low positioning which increases static loading of the muscle groups of the legs and back and abdomen.

2. Adjust the patient chair to bring the patient's oral cavity to your optimal control point

- The clinician is able to maintain a natural posture when the patient is placed in a supine, natural, full-rest position, with priority accorded to head position, so that the patient's maxillary incisors will contact the clinician's operating fingers at the Optimal Control Point.
- Research supports patient acceptance and preference for this supine patient positioning.
- Any initial patient reluctance based on differences from previous treatment presentations is alleviated when the patient realizes that this will enhance peak performance on the part of the clinician.



3. Adjust the other equipment in the operatory to support your balanced operating position

- Now that you have found your balanced position and optimal control point, you are ready to explore the important factors that are important to make this balanced position work for you. You can find them in the Five critical Set-up Criteria section.

Next

Five Critical Set-up Criteria

With Special Thanks To:

- Dr. Lance Rucker, DDS
- Dr. Susanne Sunell, Ed.D, RDH