

# SCD

# Case Study

Vertical dimension (VD) can be defined as the distance between any two points measured in the maxilla and the mandible when the teeth are in maximum intercuspation (Lucia VO., 1961). It is primarily determined by anterior tooth position and is not lost due to tooth wear as compensation occurs from lengthening of the alveolar process.

The occlusal vertical dimension (OVD) is determined by the repetitive contracted length of the closing muscles. Increases in OVD cannot be maintained as the jaw to jaw relationship will always return to the original dimension i.e. “the muscles always win” (Eriksson, P.O. and Thornell, L.E., 1983).

## RATIONALE FOR ALTERING OVD

1. Aesthetics (especially where patients appear overclosed with a prominent chin, or exhibit excessively worn, short teeth).
2. Alter the occlusal relationship.
3. Prosthodontic convenience to allow space for restorations.

## POSSIBLE CLINICAL CONCERNS BEHIND CHANGING OVD

<b>Joint or muscle pain</b>	Altering OVD does not produce pain of more than one to two weeks' duration. Any pain is a result of increased temporary muscle awareness (Christensen J. 1970).
<b>Stability</b>	<p>OVD closure has minimal risk of relapse – it may open by up to 1 mm within the first year and then remain stable and undetectable by either the clinician or the patient (Dahl BL, Krogstad O. 1985).</p> <p>OVD opening can result in variable stability with no, some or significant relapse all possible. Again, this may go unnoticed dentally.</p>
<b>Muscle activity</b>	The postural muscle tone (i.e. the rest position) reduces when OVD is increased but returns to normal within three months (Lindauer SJ., Gay T, Rendell J., 1993).
<b>Phonetics</b>	<p>'S' sounds may prove problematic but adaptation usually occurs within one month. Correction of persistent phonetic problems shortening of the lower incisors and will depend on the lower incisor position when the 'S' sound is created.</p> <p>If 'S' is generated with the lower incisors in the cingulum area of the upper incisors (i.e. behind and above the upper incisal tip), shortening the lower incisors will leave them out of contact when the teeth are in occlusion. Thus the OVD will then need to be reduced.</p> <p>If 'S' is generated by the incisors being more edge-to-edge the lower incisors can be reduced and the linguals of the upper incisors built out to maintain contact.</p>

## ANTERIOR DETERMINANTS OF VERTICAL DIMENSION (Bloom DR., Padayachy J.N. 2006)

The patient must be comfortable and satisfied aesthetically, phonetically and functionally with any OVD change. A diagnostic wax-up is valuable to plan changes. When changing the incisal position restoratively, provisional restorations must be provided initially and subsequently modified until stable CR contacts, correct labial and incisal contours, and correct incisal length (in harmony with the neutral zone, lip closure path, phonetics, envelope of function and aesthetics) are present. Incisal edges should rest along the inner vermilion border of the lower lip and are best observed watching the patient counting from 50 to 55 i.e. creating an 'F' sound. Anterior guidance should include a 'long centric' that allows a little freedom before this path is engaged and so the lower incisors are not locked, while avoiding interferences with 'T', 'D' or 'S' sounds.

## MARKERS OF SUCCESSFUL OVD CHANGE

OVD has been successfully altered when the patient exhibits an absence of tension or tenderness in either joint when vertically loaded, tooth tenderness, bruxism, posterior interferences, fremitus and wear/chipping.

## VERTICAL DIMENSION AND MANAGEMENT OF TOOTH WEAR

Severe tooth wear **does not** cause a loss of OVD nor eliminate all deflective interferences. Wear can only occur if teeth contact in functional or parafunctional mandibular movement. If anterior guidance is stable and posterior disclusion is perfected, attrition of posterior teeth cannot occur. Any restoration of severely worn teeth must be performed so that the altered tooth contours do not steepen or restrict the envelope of function.

The goal of treatment for all severe wear patients is restoration of clinically effective form and function to prevent further tooth surface damage. This is achieved by ensuring posterior disclusion from the moment the mandible moves from centric relation.

## CASE REPORT

This patient presented seeking an improved dental appearance, desiring more tooth structure to be visible for a more attractive smile. The plan was to divide the new vertical build-up between the lower and upper arches.

Preoperative presentation showing deep overbite and lower incisal wear



The laboratory was asked to design a diagnostic wax up for the patient to approve. This wax-up involved increasing the height of teeth in both arches as originally planned.



The dentist then requested a Penn Composite Stent™ be made for the upper arch which the dentist would build up entirely with composite. Due to the patient's financial constraints, the buildup on the lower teeth was achieved using a lower full arch Michigan splint. Using a splint to adjust the occlusal height in one arch can provide flexibility to alter the OVD over time, protect restorations and enhance achievement of posterior disclusion.

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