

If you consider the geometry of the temporal mandibular joint, masseter and anterior teeth. Most alterations to vertical dimension are measured at the anterior teeth, with a 3-mm alteration in anterior vertical dimension resulting in less than 1 mm of change in masseter muscle length. Additionally, if the condyle is seated in the fossa of the temporal mandibular joint during treatment, for each millimeter the condyle is seated vertically the masseter muscle length is reduced by 1 mm. It is, therefore, possible that if the condyle is seated as the anterior vertical dimension is increased, there will be minimal, if any, change in masseter length, and there would be no expectation of relapse.

The literature definitely shows examples of a relapse toward the original vertical dimension since condylar position was not factored in the literature studies, it may be one reason for continued debate on the topic of stable vertical dimension changes.¹¹

The other area that is clear from the literature about stability is that any changes that will occur following an alteration in vertical dimension occur in the first six months following the change. So the bottom line is placing the patient on temporaries for 6 months prior to finishing eliminates the issue.

Will Muscle Activity Levels Be Altered?

The fourth area of concern when altering vertical dimension is the impact on muscle activity levels. There are two components to the activity levels of muscles: the muscle activity level when the mandible is at rest and the muscle activity level when the patient is clenching. As the vertical dimension is increased, resting muscle activity actually decreases. The more open the vertical dimension is, the less activity is present in the muscles in a postural position. This decrease in muscle activity occurs until there is approximately 10 mm to 12 mm of anterior vertical opening. Opening beyond 10 mm to 12 mm starts to increase elevator muscle activity. Interestingly enough, if the vertical change is maintained for 3 to 4 months, the resting muscle activity returns to a level closely matching the pretreatment resting muscle activity level, although the vertical dimension has not been decreased.¹²⁻¹³

The impact of increasing vertical dimension on clenching muscle activity is the opposite; as the vertical dimension is

increased, the electrical activity level in the elevator muscles increases during clenching beyond their pretreatment level. Again, however, if the vertical dimension is maintained for 3 to 4 months, this increased level of clenching electrical activity similarly reduces to pretreatment levels.¹⁴

Hence, although there is an initial change both in resting and clenching activity levels, after 3 to 4 months at the new vertical dimension, the muscle activity is similar to pretreatment levels, because of body's natural neuromuscular adaptability.

Will Speech Be Affected In A Negative Way?

The final area of concern is phonetics particularly the sibilant s sounds. Again high levels of patient adaptability is seen due to proprioceptive input of teeth.

It is the muscles that control the mandibular movements of speech that can move the mandible and its teeth into the "s" position. The lower incisors are carried to within 1 to 1.5 mm of the incisal edges or lingual surfaces of the upper central incisors.

If a significant increase in incisal ledge length occurred to either the maxillary or mandibular incisors, The teeth may now collide during the "S" sounds, generally resulting in a whistling or slurring. This can be evaluated clinically by simply having the patient say "66" or "77" and watching to see if the anterior teeth touch during the sibilant sound. If they do, and the patient has been given 2 to 4 weeks to adapt and has not, it will be necessary to shorten either the upper or the lower incisor.¹⁵⁻¹⁶

Conclusion

There are multiple acceptable vertical dimensions at which patients can be treated, therefore, using vertical dimension as a sole justification for treatment is not supported. In addition, if the patient's posterior teeth are unworn and in occlusion, virtually all patients can be treated at their existing vertical dimension if they are willing to consider orthodontic movement of their anterior teeth or crown lengthening and restoration of their anterior teeth. At the same time, if a patient does need all of their dentition rehabilitated, increasing vertical dimension is a perfectly acceptable way of achieving the esthetics and functional results that are desired.

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