

Advanced Restorative Techniques and the Full Mouth Reconstruction. Vertical Dimension And Changes During Restorative Treatment. Part 5

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A highly respected specialist in Prosthodontics, Paul has published many scientific articles in the dental press and is an expert lecturer in his field with Tipton Training Academies in Manchester, Leeds, London and Dublin. After gaining his Masters Degree in Conservative Dentistry in 1989, he was awarded the Diploma in General Dental Practice by the Royal College of Surgeons four years later and received Specialist status in Prosthodontics in 1999 from the GDC. An ex-professional cricketer with Lancashire County Cricket Club, he is currently the President of the British Academy of Restorative Dentistry (www.bard.org.uk). He is one of the UK's most successful dental teachers in the fields of Restorative, Cosmetic and Implant Dentistry over the last 20 years with more than 2000 dentists completing a yearlong certificate courses from one of the Tipton Training Academies (www.tipton-training.co.uk).

Introduction

Changes in vertical dimension are often required for either gaining restorative space during restorative procedures or for improving facial aesthetics. Occlusal splints are used to first verify that the increase in vertical dimension can be tolerated and this is easily accomplished in most cases as long as this increase is done around RAP or Centre Relation so that the condyles are in their most relaxed, bone braced and reproducible position. Increases and decreases in

vertical dimension will be discussed showing positive changes in facial aesthetics as treatment is completed.

Increasing VDO

There is some debate among professionals as to what constitutes the need to open VDO (vertical dimension of occlusion) in the restoration of anterior teeth or partial or full mouth reconstruction. In most cases, clinicians look to alter vertical dimension for one or all of the following reasons: to gain space for the restoration of the teeth; to improve aesthetics; to correct occlusal relationships. Understanding what determines the VDO and what the effects of altering it have on the temporomandibular joint (TMJ), muscle comfort, bite force, speech, and long-term occlusal stability are prerequisites to restoring the worn dentition. Spear clearly outlines the principles of VDO and concludes that "patients can function at many acceptable vertical dimensions, provided the condyles are functioning from centric relation and the joint complex is healthy." He states that "vertical is a highly adaptable position, and there is no single correct vertical dimension." He further concludes that the best vertical dimension is the one that satisfies the patient's aesthetic desires and the practitioner's functional goals with the most conservative approach. Article no. 3 in the series dealt with the diagnostic approach to increasing VDO. Mohindra showed that increasing VDO resulted in a younger looking patient.

Space

When starting from retruded axis position, opening of the anterior teeth by 3 mm will yield a posterior separation of approximately 1 mm and stretch the masseter muscle length approximately 1 mm. If the condyles are not in retruded axis positions and are subsequently seated to a more superior position, every millimeter of vertical seating will reduce the masseter muscle length by 1 mm, thereby eliminating the need for a true opening of vertical dimension.

Case Study 1

Mrs S (Fig 1) was referred to me by her General Dental Practitioner for a full mouth reconstruction because of the poor aesthetics of her upper crowns (Fig 2) and the wear taking place on her lower anterior teeth (Fig 3) and because she wanted an improvement of her smile (Fig 4).

As part of the initial diagnostics, an assessment was made of her vertical facial height by using an intra-oral face and wax jaw registration as described in article no. 3 (Figs 5 and 6) followed by a diagnostic wax-up at the increased vertical dimension (Figs 7 and 8).

Her anterior teeth showed severe wear in the lower and poor width/length ratio of her upper crowns (Fig 9) together with a centre line shift of approximately 2 mm. Crown lengthening procedures were done (Fig 10) followed by tooth preparations (Figs 11-14) and placement of prototypes in

sections as per the previous article.

The stages in full mouth reconstruction were followed as in article no. 4 of the series and the final end result can be seen in Figs 15-19, showing a facial improvement, and a younger looking patient.

Reduction of VDO

Conversely, although not as predictable a procedure, reduction or shortening of vertical dimension is both possible and often advisable. It cases where there may be an overall anterior open bite, a simple posterior occlusal adjustment (reduction in vertical dimension) will result in anterior teeth meeting with the condyles in retruded axis position. This then allows for the development of a mutually protected occlusion and anterior guidance on the anterior teeth. The following case study will show how occlusal adjustment can improve patient comfort.

A reduction in vertical dimension can also have a positive effect in facial aesthetics in taking a long, thin face and making it look more in proportion. However, a word of warning. Whilst increases in vertical dimension can be first tried out without any tooth destruction with an occlusal splint, a reduction cannot be tried out prior to tooth preparation and so is not reversible. A great deal of experience is required before taking on a case such as this.

Case Study 2

This lady was referred to me because of her failing upper anterior com-

posite veneers, TMJ dysfunction and poor aesthetics (Fig 20). Initial examination revealed a near edge-to-edge occlusion (Fig 21) with a vertical and horizontal slide from RCP into ICP. Upon manipulation to RCP there was an anterior open bite present. The goal of treatment was to equilibrate the patient and at the same time reduce her VDO so that better anterior contacts were gained and then to restore to a new ICP around her RAP with better anterior guidance.

Initial casts were taken and placed on the semi-adjustable articulator (Fig 22). These casts had been pin-dexed so that the posterior quadrants could be removed (Fig 23). Once reviewed the VDO was reduced by approximately 3 mm showing true anterior contacts after a planned posterior occlusal equilibration (Fig 24). Further adjustment was then done on the casts so that the anterior teeth contacted in a more even manner (Figs 25-27), further reducing VDO by 2 mm (Figs 28-30).

Full diagnostic procedures were then performed including diagnostic wax-ups to this new reduced VDO (Figs 31, 32) and the patient was prepped for upper dentine bonded crowns (Fig 33) and upper and lower posterior porcelain fused to metal crowns. Note the patient's lower anterior teeth were not restored but only whitened. Silver dies (Fig 34) were used by the technician for fabrication of the final dentine bonded

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Fig. 1. Patient's initial full face



Fig. 2. Upper anterior teeth showing centre line shift



Fig. 3. Lower worn anterior teeth



Fig. 4. Presenting smile with centre line shift



Fig. 5. Full face closed mouth



Fig. 6. Full face closed mouth with increase of 5 mm in VDO



Fig. 7. Upper diagnostic wax-up



Fig. 8. Lower diagnostic wax-up



Fig. 9. Poor width/length ratio of the upper teeth



Fig. 10. Upper teeth after crown lengthening



Fig. 11. Prep guide when prepping upper teeth



Fig. 12. Upper tooth preps



Fig. 13. Prep guide when prepping lower teeth



Fig. 14. Lower tooth preps



Fig. 15. Final upper anterior crowns



Fig. 16. Final lower crowns



Fig. 17. Upper restored arch – occlusal view



Fig. 18. Final smile close up



Fig. 19. Final full face smile showing increase in VDO and younger appearance



Fig. 20. Initial presenting smile



Fig. 21. Edge-to-edge occlusion in ICP



Fig. 22. Models mounted in RCP (front view)



Fig. 23. Models mounted in RCP (side view) showing anterior open bite

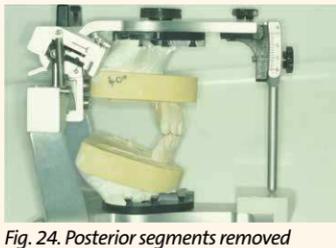


Fig. 24. Posterior segments removed



Fig. 25. Close up showing anterior tooth relationships when posterior segments removed

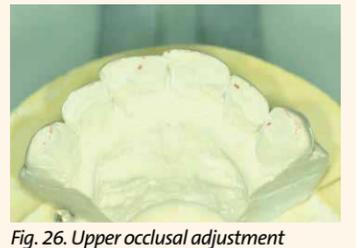


Fig. 26. Upper occlusal adjustment



Fig. 27. Lower occlusal adjustment

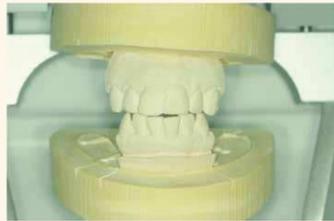


Fig. 28. Previous anterior relationships

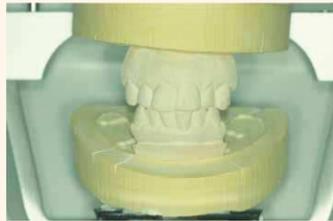


Fig. 29. Final anterior relationships

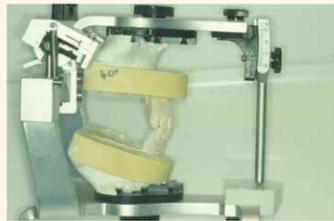


Fig. 30. Further reduction of VDO



Fig. 31. Upper diagnostic waxing



Fig. 32. Lower diagnostic waxing



Fig. 33. Upper dentine bonded crown preps



Fig. 34. Silver dies



Fig. 35. Upper dentine bonded crowns placed



Fig. 36. IPC with improved overjet, overbite and anterior guidance



Fig. 37. Occlusal splint (occlusal view)



Fig. 38. Final smile (close up)



Fig. 39. Final facial smile

upper anterior crowns (Fig 35). The final restorations show better overjet and overbite with anterior guidance now on the anterior teeth and full interdigitation of all teeth around RAP,

and no slide between RCP and ICP (co-incident position) (Fig 36). Careful post restorative adjustment was performed after fitting of the crowns and a post restorative splint fabri-

cated, for night-time use (Figs 37, 38).

The final smile shows the aesthetic improvements (Figs 39, 40).

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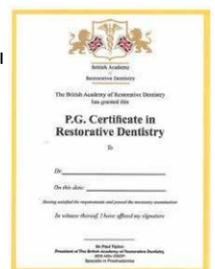
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