Academy of Microscope Enhanced Dentistry

Integrating Macroscopic Planning with Microdenistry

Johnson Ozgur, DDS, MSc

Dr. Cansin (Johnson) Ozgur is a cosmetic and restorative dentist practicing in Toronto, Canada, and the founder of Toronto Smile Design – Yorkville Dental. He graduated from Istanbul University Faculty of Dentistry and completed a Master's Degree in Oral Surgery at Yeditepe University Faculty of Dentistry. As a Digital Smile Design Instructor in Canada, Dr. Ozgur has been teaching and advancing digital smile design concepts since 2015. His clinical philosophy combines cosmetic dentistry, oral surgery, digital workflows, and patient-centered comprehensive care, with a strong focus on education, mentorship, and modern interdisciplinary dentistry

Magnification has improved the dental practice in every field, from the dental office to the dental laboratories. Magnification in dentistry provides a better visualization of margins, more effective isolation, refined preparation, and more disciplined management of adhesive procedures (Bud et al., 2021). These benefits improve clinical results across every aspect of dentistry drastically.

However, magnification alone does not replace the need for a facially driven design and a carefully simulated treatment plan.

While a microscope helps us achieve precise margin preparation and efficiently remove excess cement, it does not inform critical decisions such as incisal edge positioning or the need to change the vertical dimension or diagnose the complex relationships among facial structures, musculature, joints, teeth, and the restorative space. In cases without proper design and planning, magnification merely enables more accurate execution of a plan that was neither designed nor executed.

As a reason, comprehensive restorative dentistry must start with macro planning. Before the tooth preparation starts under magnification, it is extremely important to visualize the final position of the teeth. If the macro design allows it, preparation performed even under high magnification may be unnecessary.

Macro decisions should be guided by facial analysis, lip support, tooth display at rest, smile arc, incisal edge position, phonetics, occlusal plane, gingival architecture, and the patient's functional pattern (Coachman & Calamita, 2012; Martins et al., 2017). With the lack of macro vision, treatment risks become a tooth-by-tooth procedure, potentially resulting in

restorations that appear enhanced individually but fail to address the patient's underlying functional concerns or possible microcracks in the treatment plan armour.

This macro-guided approach is critical for patients with worn-out teeth, deep bite, limited restorative space, short clinical crowns, parafunctional habits, loss of anterior guidance, or recurrent fractures. In such cases, the first and most important clinical question should not be, "How much preparation is required for this tooth?" On the contrary, it is more minimally invasive to ask, "Is it possible to reposition the restoration morphology to minimize the need for tooth structure preparation?"

Modifying the vertical dimension of occlusion (VDO) is mainly a macroscopic decision in full mouth rehabilitation. When accurately diagnosed and thoroughly tested, increasing VDO can create restorative space through additive means. Rather than further reducing already compromised teeth to accommodate ceramics, clinicians can often increase the volume using wax-ups, digital designs, mock-ups, provisional restorations, and bonded ceramic restorations (Bomfim et al., 2020; Muts et al., 2014). In cases such as worn dentition, the most conservative approach is not merely a smaller preparation, but rather an optimized vertical plan.

It is crucial to recognize that increasing VDO is not a shortcut; it is rather a complex functional and biological decision. Any proposed change and clinical decision must be carefully assessed in relation to facial proportions, phonetics, freeway space, lip support, envelope of function, anterior guidance, posterior stability, joint comfort, and muscular adaptation before we propose or implement a permanent change in our patients' lives. While digital planning allows us to visualize the proposed outcome, it cannot replace for clinical judgment. The design should be validated through a mock-up, digital simulations, splints, or a provisional phase prior to fabrication of the final restorations (Qiu et al., 2024).

At this stage, additive dentistry transcends material selection and embodies a philosophy of preservation. By generating restorative space through vertical and functional planning, it is often possible to preserve more enamel and minimize unnecessary dentin exposure. This is significant because enamel is the most reliable substrate for bonded ceramic restorations, particularly veneers and additive restorations (Alqutaibi et al., 2025; Ma et al., 2023).

Once the macro treatment plan is completed, assessed and simulated, micro-dentistry gains clinical significance. Magnification helps us execute the plan precisely, including preparation control, tissue management, adhesive procedures, cement removal, finishing, and margin evaluation. However, the effectiveness of these techniques depends on the quality of the underlying treatment design.

Ideal dental outcomes are not achieved solely through operative techniques. They result from diagnosis, digital and/or conventional design, mock-up, provisionalization, and a commitment to preserving tooth structure whenever possible. In comprehensive restorative dentistry, predictability is achieved by adhering to the correct sequence: progressing **from macroscopic planning to microdentistry.**

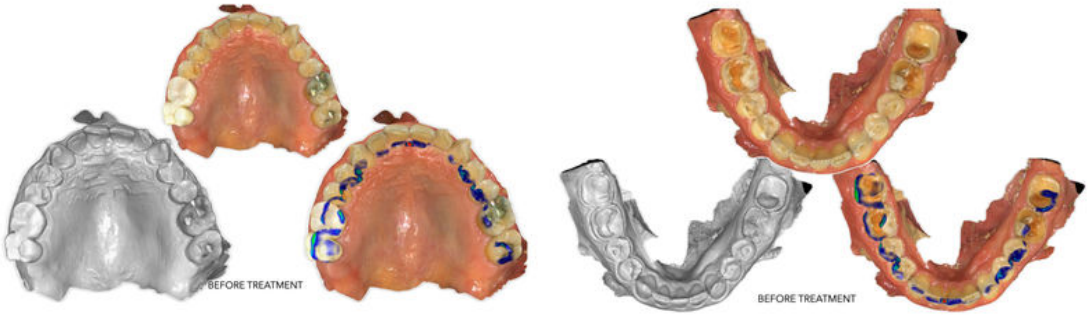


Figure 1-2. The pre-operative occlusal view shows severe tooth wear with flattened posterior anatomy and limited restorative space. In cases like this, the first decision is not how much tooth structure to remove, but how to create space conservatively. A macroscopic plan that evaluates vertical dimension, occlusal stability, and restorative volume allows the case to be approached additively, preserving as much remaining tooth structure as possible before micro-level execution begins

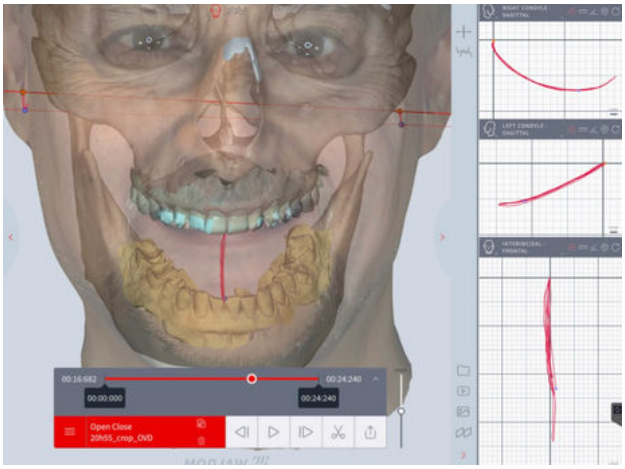
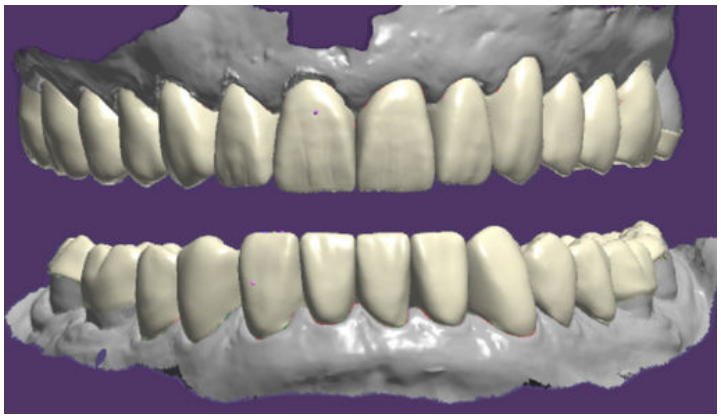


Figure 3. Pre-operative MODJAW dynamic jaw motion records were used to evaluate mandibular movement, condylar pathways, functional envelope, and occlusal risk before preparation. In a severely worn dentition, this information helped guide the planned increase in vertical dimension of occlusion. By opening the bite predictably, restorative space could be created through an additive approach rather than through aggressive reduction of the remaining tooth structure.

Figure 4. The digital restorative design demonstrates the planned additive reconstruction after evaluation of the patient's worn dentition and limited restorative space. The restorations were designed over mainly minimal-margin preparations, allowing the case to be approached with preservation of remaining tooth structure. This stage translated the macroscopic VDO and esthetic plan into a controlled restorative design before micro-level clinical execution.



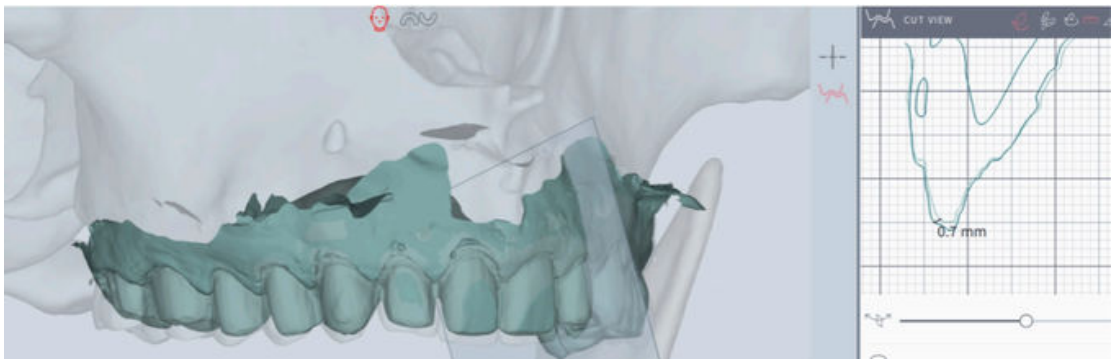


Figure 5. The digital restorative design demonstrates the planned additive reconstruction after evaluation of the patient's worn dentition and limited restorative space. The restorations were designed over mainly minimal-margin preparations, allowing the case to be approached with preservation of remaining tooth structure. This stage translated the macroscopic VDO and esthetic plan into a controlled restorative design before micro-level clinical execution.

Figure 6. The initial intraoral image demonstrates a collapsed smile with generalized tooth wear, deep bite, reduced anterior display, and limited restorative space. This clinical presentation required macroscopic planning before any preparation was considered. By evaluating the vertical dimension of occlusion, incisal edge position, anterior guidance, and restorative volume, the case could be approached additively rather than through excessive tooth reduction. This image represents the starting point for a treatment strategy focused on opening the bite, restoring tooth proportions, and preserving remaining tooth structure.

Figure 7. The post-operative view demonstrates the final additive restorations delivered after increasing the vertical dimension of occlusion. The restored anterior proportions, improved overbite relationship, and increased restorative space reflect the original macroscopic plan. By creating space through VDO planning rather than excessive tooth reduction, the final restorations could be completed with a conservative adhesive approach.

Figure 8. The pre-operative and post-operative panoramic radiographs demonstrate the additive approach used in this rehabilitation. By increasing the vertical dimension of occlusion, restorative space was created through macroscopic planning rather than aggressive tooth reduction. The comparison shows how the final restorations were integrated into a comprehensive plan designed to preserve remaining tooth structure while restoring function and esthetics.

References

1. Alqutaibi, A. Y., Saker, S., Alghauli, M. A., Algabri, R. S., & AbdElaziz, M. H. (2025). Clinical survival and complication rate of ceramic veneers bonded to different substrates: A systematic review and meta-analysis. The Journal of Prosthetic Dentistry.
2. Bomfim, D. I., Rahim, N. M., & Austin, R. S. (2020). Biomechanical planning for minimally invasive indirect restorations. British Dental Journal, 229(7), 425–429.
3. Bud, M., Jitaru, S., Lucaciu, O., Korkut, B., Dumitrascu-Timis, L., Ionescu, C., Cimpean, S., & Delean, A. (2021). The advantages of the dental operative microscope in restorative dentistry. Medicine and Pharmacy Reports, 94(1), 22–27.
4. Coachman, C., & Calamita, M. (2012). Digital smile design: A tool for treatment planning and communication in esthetic dentistry. Quintessence of Dental Technology, 35, 103–111.
5. Ma, K. S., Wang, L. T., & Blatz, M. B. (2023). Efficacy of adhesive strategies for restorative dentistry: A systematic review and network meta-analysis of double-blind randomized controlled trials over 12 months of follow-up. Journal of Prosthodontic Research, 67(1), 35–44.
6. Martins, A. V., Albuquerque, R. C., Santos, T. R., Silveira, L. M., Silveira, R. R., Silva, G. C., & Silva, N. R. F. A. (2017). Esthetic planning with a digital tool: A clinical report. The Journal of Prosthetic Dentistry, 118(6), 698–702.
7. Muts, E. J., van Pelt, H., Edelhoff, D., Krejci, I., & Cune, M. (2014). Tooth wear: A systematic review of treatment options. The Journal of Prosthetic Dentistry, 112(4), 752–759.
8. Qiu, A., Xu, L., Zhang, Y., Chen, K., Fang, S., Zhang, Y., Zhong, L., & He, R. (2024). Digital assisted multidisciplinary treatment for complex occlusal rehabilitation: An 18-month follow-up case report. BMC Oral Health, 24, 818.