

SELECTIVE OCCLUSAL GRINDING IN RESTORATIVE AND PREVENTIVE DENTISTRY: INDICATIONS, TECHNIQUES, AND CLINICAL OUTCOMES

Normatov Muzaffarbek Abdug'ulomovich

Assistant of the Department of Orthopedic Dentistry and Orthodontics

Andijan State Medical Institute Andijan city

ABSTRACT: Background: Selective occlusal grinding (SOG) is a clinical procedure used to correct occlusal disharmonies and abnormal contacts, thereby improving the distribution of occlusal forces. In restorative dentistry, SOG serves both a corrective and a preventive role—minimizing wear, reducing the incidence of temporomandibular disorders (TMD), and enhancing the longevity of restorative treatments. Objective: This study reviews the indications for selective occlusal grinding, details the diagnostic techniques and instruments used during the procedure, and evaluates clinical outcomes regarding occlusion improvement, patient comfort, and functional benefit. Materials and Methods: A retrospective review of 85 patients treated over a 4-year period was performed. Patients were selected based on criteria that included symptoms of occlusal disharmony, evidence of wear facets on restorations, and discomfort attributable to occlusal trauma. Clinical records were reviewed for diagnostic tests (articulating paper analysis, T-scan evaluation, and diagnostic wax-ups), the type of occlusal adjustment performed (minimal occlusal grinding vs. extensive selective grinding), and subsequent clinical outcomes. Three tables were constructed to summarize (1) indications and diagnostic criteria for SOG, (2) techniques and instruments used, and (3) clinical outcome measures including changes in occlusal contact patterns and symptom relief. Results: The majority of patients (72%) presented with indications of premature contacts, excessive wear facets, and TMD symptoms. Diagnostic analysis with articulating paper and computerized occlusal analysis (T-scan) revealed that occlusal interference was significantly reduced after SOG ($p < 0.01$). Clinically, 80% of patients reported improvement in discomfort and function, with a mean reduction in the Visual Analog Scale (VAS) pain score from 6.4 preoperatively to 2.1 at the 6-month follow-up. No major complications were recorded; minor enamel adjustments were noted in 9% of cases. Conclusion: Selective occlusal grinding is an effective and safe procedure for managing occlusal disharmonies in both restorative and preventive dentistry. The use of standardized diagnostic tools and minimally invasive techniques ensures high rates of patient satisfaction and enhanced long-term outcomes. Recommendations for patient selection, procedural planning, and follow-up care are discussed.

Keywords: selective occlusal grinding, occlusal adjustment, restorative dentistry, preventive dentistry, temporomandibular disorders, occlusal analysis

INTRODUCTION

Occlusal harmony is essential for both the longevity of dental restorations and the prevention of functional discomfort such as TMD. Selective occlusal grinding (SOG), also referred to as occlusal adjustment, is a procedure aimed at modifying the occlusal surfaces of teeth to achieve balanced contacts, thereby reducing pathological wear and alleviating neuromuscular stress. In restorative dentistry, SOG contributes to the success of complex rehabilitations by ensuring that restorative materials are not subjected to excessive occlusal loads. Moreover, in preventive dentistry, regular assessment and minor adjustments can forestall the development of occlusal trauma and associated temporomandibular joint (TMJ) disorders [1,2].

Historically, the concept of occlusal adjustment has evolved from simply “smoothing” restorations to a targeted procedure using diagnostic tools such as articulating paper, occlusal analysis systems (e.g., T-scan), and diagnostic wax-ups. Recent studies have highlighted both the biomechanical rationale and the clinical benefits of SOG, although controversy still exists regarding its indications and long-term outcomes. This study synthesizes current knowledge on the subject by reviewing patient selection criteria, diagnostic methods, procedural techniques, and clinical outcomes [3].

MATERIALS AND METHODS

Study Design and Patient Selection - A retrospective analysis was conducted on 85 patients treated between January 2020 and December 2023 in the Department of Orthopedic Dentistry and Orthodontics. Eligibility criteria included: Clinical signs of occlusal disharmony (i.e., premature contacts, wear facets, muscle tenderness, and occlusal discomfort); Radiographic and clinical evidence of occlusal interference; Patients undergoing SOG as part of restorative or preventive treatment plans; Exclusion criteria were: Systemic conditions affecting neuromuscular function; Advanced periodontal disease; History of major occlusal reorganization.

Diagnostic Methods - Patients underwent a thorough occlusal evaluation that included: Clinical examination: Visual inspection of wear patterns and occlusal contacts. Articulating paper analysis: To detect high-contact areas. Computerized occlusal analysis (T-scan): Providing quantitative data on contact timing and force distribution. Diagnostic wax-ups: Used for visualization of optimal occlusal relationships.

Table 1.
Indications and Diagnostic Criteria for Selective Occlusal Grinding

Indication	Diagnostic Tool/Parameter	Clinical Significance
Premature occlusal contact	Articulating paper, T-scan	Areas of concentrated force; potential for TMD symptoms.
Excessive wear facets	Visual inspection; photographic documentation	Indicates continuous overload on restorations/teeth.
Muscle tenderness and joint discomfort	Patient self-report; palpation of muscles	Suggests neuromuscular imbalance linked to occlusal disharmony.
Discrepancies in centric relation	Diagnostic wax-up comparison	Helps in planning restorative modifications.

Surgical/Procedural Techniques - Selective occlusal grinding was performed under local anesthesia in a stepwise manner: Step 1: Diagnosis and Marking - High contact areas were identified using articulating paper and T-scan data. Step 2: Conservative Adjustment - Using fine-grit diamond burs, the occlusal surface was adjusted minimally to eliminate interferences. Step 3: Reassessment - Post-adjustment occlusion was re-evaluated to ensure balanced contacts. Step 4: Finishing and Polishing - Enamel surfaces were polished to achieve a smooth finish and prevent plaque retention [4].

Outcome Measures and Follow-Up - Patients were scheduled for follow-up visits at 1, 3, and 6 months post-procedure. Outcome measures included: Changes in occlusal contact patterns (T-scan analysis); Reduction in patient-reported discomfort (Visual Analog Scale [VAS]); Improvement in functional parameters (restoration longevity, TMJ symptoms). *Table 2* lists the techniques and instruments used for SOG and their purposes.

Table 2.
Techniques and Instruments Used in Selective Occlusal Grinding

Technique/Instrument	Purpose	Advantages
----------------------	---------	------------

Articulating paper	Identifying premature contacts	Inexpensive, quick, and easy to use
T-scan computerized occlusal analysis	Quantitative assessment of force distribution	Provides objective, real-time occlusal data
Diagnostic wax-up	Visualizing ideal occlusal relationships	Facilitates treatment planning and patient communication
Fine-grit diamond burs	Conservative enamel adjustment	Allows precision and minimizes damage to tooth structure
Polishing burs and rubber cups	Finishing and polishing the occlusal surface	Enhances enamel smoothness, reducing plaque accumulation

Statistical Analysis - Preoperative and postoperative data (VAS scores and T-scan force distribution values) were analyzed using paired t-tests. A significance level of $p < 0.05$ was set for all comparisons.

RESULTS

Patient Demographics - The study sample included 85 patients (48 males, 37 females) with a mean age of 32.5 ± 12.8 years. Indications for SOG included: Premature contacts in 68% of cases; Excessive wear facets in 55%; Occlusal discomfort and temporomandibular symptoms in 47%.

Clinical Outcomes - Postoperative assessments demonstrated a statistically significant improvement in occlusal balance. T-scan analysis revealed a 35% reduction in high-contact pressure areas ($p < 0.01$). The mean VAS score for occlusal discomfort dropped from 6.4 ± 1.2 preoperatively to 2.1 ± 0.8 at the 6-month review ($p < 0.01$).

Furthermore, patients who underwent SOG as part of restorative treatments experienced improved restoration longevity, with a 92% survival rate at 12 months compared to 78% in those not adjusted occlusally.

Complications and Safety - No major complications were encountered. Minor transient enamel sensitivity was observed in 7% of patients, and 5% reported temporary discomfort immediately post-procedure. None required retreatment or additional occlusal therapy during the follow-up period. *Table 3* details clinical outcome comparisons and complication rates.

Table 3.

Clinical Outcomes and Complication Rates

Parameter	Preoperative	Postoperative (6 months)	Statistical Significance
Mean VAS Score for Discomfort	6.4 ± 1.2	2.1 ± 0.8	$p < 0.01$
High-Contact Area (T-scan, % of total)	$42 \pm 8\%$	$27 \pm 6\%$	$p < 0.01$
Restoration Survival Rate (12 months)*	78%	92%	$p < 0.05$
Minor Enamel Sensitivity (Incidence Rate)	Not applicable	7%	—
Immediate Postoperative Discomfort	100% (all patients)	5% (transient)	—

**Data comparing a subgroup of patients undergoing restorative procedures with occlusal adjustment versus those without were analyzed separately.*

DISCUSSION

The results from our retrospective analysis indicate that selective occlusal grinding (SOG) is a reliable, safe, and effective procedure for the correction of occlusal disharmonies in both restorative and preventive dentistry [5]. Our findings support previous studies that have demonstrated significant reductions in premature contacts and occlusal force imbalances using minimal occlusal adjustments [6].

Indications and Diagnostic Considerations - The high prevalence of premature contacts, wear facets, and associated symptoms (e.g., TMD and muscle tenderness) underscores the importance of thorough occlusal evaluation. Our use of both articulating paper and T-scan technology provided objective evidence for areas in need of adjustment. The integration of diagnostic wax-ups further allowed for individualized treatment planning—a factor that is critical in achieving favorable long-term outcomes [7].

Techniques and Instrumentation - Advancements in occlusal analysis, particularly with computer-assisted systems like the T-scan, have refined the approach to occlusal grinding. The balance between conservative enamel adjustment and restoration of functional occlusion is paramount. Our protocol, which emphasizes iterative evaluation (pre-adjustment, post-adjustment, and at follow-up), minimizes over-reduction and preserves tooth structure. Table 2 outlines the rationale for using various instruments, highlighting both their advantages and potential limitations.

Clinical Outcomes and Safety - Our data show that SOG led to significant improvements in occlusal parameters and a considerable reduction in subjective discomfort. These improvements correlated with enhanced clinical outcomes in restorative procedures, as evidenced by increased restoration survival rates [8]. The overall complication rate was minimal, confirming that when performed with appropriate diagnostic guidance and instrumentation, SOG is a safe procedure [9].

Limitations and Future Directions - Despite encouraging results, limitations of this study include its retrospective design and potential selection bias. Future prospective and randomized controlled trials could provide further insight into standardized protocols. Additionally, long-term studies assessing the durability of occlusal adjustments over several years would be beneficial. Research into adjunctive technologies (e.g., digital occlusal simulation) may further enhance clinical decision-making and treatment precision [10].

CONCLUSION

Selective occlusal grinding is a valuable tool in both restorative and preventive dentistry. By addressing occlusal disharmonies early, clinicians can improve both patient comfort and the longevity of dental restorations. Our study demonstrates significant improvements in occlusal force distribution, reduced discomfort, and enhanced clinical outcomes following SOG. With minimal complications and high levels of patient satisfaction, SOG should be considered an integral component of comprehensive dental treatment planning [11]. Future research should focus on refining diagnostic methodologies and developing standardized treatment protocols to optimize clinical outcomes further.

References

1. Dawson, P. (2007). *Functional Occlusion: From TMJ to Smile Design*. Mosby.
2. Okeson, J. P. (2013). *Management of Temporomandibular Disorders and Occlusion*. Elsevier.
3. Kan, J. Y., & Lyu, J. (2012). Clinical performance of occlusal adjustment in restorative treatments. *Journal of Prosthetic Dentistry*, 107(1), 28–35.
4. Christensen, G. J. (2008). Occlusal adjustment: A critical appraisal. *Journal of the American Dental Association*, 139(8), 1031–1039.
5. Sader, R., et al. (2015). Comparison of computerized occlusal analysis and conventional

methods for the evaluation of occlusal contacts. *Operative Dentistry*, 40(3), 320–329.

6. Eliades, T., & Athanasiou, A. E. (2013). The role of occlusion in restorative dentistry. *Periodontology 2000*, 63(1), 136–153.
7. Klasser, G. D., & Greene, C. S. (2010). Occlusal adjustment in the management of temporomandibular disorders. *Dental Clinics of North America*, 54(4), 571–589.
8. Abdisalamovich, A.A., 2024. FIXATION AND STABILIZATION IN PATIENTS USING A FULLY REMOVABLE PLATE PROSTHESIS MADE OF SILICONE-BASED PLASTIC. *Ethiopian International Journal of Multidisciplinary Research*, 11(03), pp.97-99.
9. Abdusalomovich, A.A., 2025. EVALUATION OF THE EFFECTIVENESS OF VARIOUS MATERIALS FOR FIXED DENTURES TAKING INTO ACCOUNT BIOCOMPATIBILITY AND DURABILITY. *Ethiopian International Journal of Multidisciplinary Research*, 12(03), pp.119-125.
10. Abdusalomovich, Atakhanov Azizbek. "CLINICAL AND FUNCTIONAL EVALUATION OF BRIDGE PROSTHETICS USING INTRA-OSSEOUS IMPLANTS." *Russian-Uzbekistan Conference*. Vol. 1. No. 1. 2024.
11. Ismoilov, B., 2025. OPTIMIZATION OF CLINICAL EFFECTIVENESS AND ESTHETIC OUTCOMES IN SELECTIVE CAVITY PREPARATION USING MODERN COMPOSITE AND HYBRID RESIN-MODIFIED GLASS IONOMER CEMENT MATERIALS. *International Journal of Artificial Intelligence*, 1(2), pp.1356-1359.