

Int Poster J Dent Oral Med 2009, Vol 11 No 4, Poster 466

Cast dental restorations modern repair possibilities

Language: English

Authors:

Assist. Prof. Dr. Sorin Porojan, Assoc. Prof. Dr. Liliana Sandu, Prof. Dr. Cristina Maria Bortun, Assist. Prof. Dr. Florin Topala, "Victor Babes" University of Medicine and Pharmacy Timisoara, University School of Dentistry, Timisoara, Romania

Date/Event/Venue:

May 7-10th, 2008

The 1st International Scientific Conference of Faculty of Dentistry Jordan University of Science and Technology and 5th Annual Scientific Meeting of IADR-JOR
Amman, Jordan

Introduction

In classical conditions some lack of substance defects of cast restorations need their renewal, but modern techniques of dental alloys welding in protective gas shield allow correction of these defects, without repeating all of the clinical and technical stages.

Objectives

The aim of the study was to test microplasma welding possibilities of cast dental restorations.

Material and Methods

Different Ni-Cr cast restorations with defects were chosen in order to add proximal contacts, to repair casting voids and to lengthen short cast crowns (Fig. 1-3) using microplasma welder (Schütz Dental, Rosbach, Germany). As filler material a Ni-Cr wire Wiroweld NC (Bego, Bremen, Germany) was selected. The optimal welding parameters were correlated with the defect type, size, and working stage.

If these marginal discrepancies are minor and if cast the piece correctly adapts to die axial, proximal and occlusal and there are no other casting defects, they can be repaired by welding with filler material.

Nondestructive and destructive analyses tested the welding quality.



Fig. 1: Lack of substance defects on restoration



Fig. 2: Undersized contact area



Fig. 3: Marginal lack of substance defect on restoration



Fig. 4: Filling of the material absence by welding

Results

The welding parameters were determined for each defect type. Pores and holes defects repairs (Fig. 4) were made using the following welding parameters: power step 6 and pulse delay 35 ms both for deposition and for surface fining. Undersized contact areas were corrected by welding with filler material (Fig. 5) using the parameters: power step 6 and pulse delay 30 ms for deposition and power step 7 and pulse delay 35 ms for surface fining. The used parameters for minor marginal discrepancies (short restoration) (Fig. 6) were: power step 3 and pulse delay 25 ms for wire fixing, deposition of filler material and fining. An adequate combination of them allowed to obtain optimal repairs. These were proved by testing methods (Fig. 7-9).



Fig. 5: Rebuilding of the contact area by welding with filling material



Fig. 6: Extension of the cast restoration margin by welding with filling material

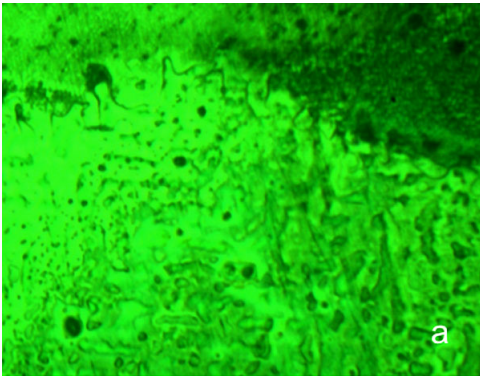


Fig. 7a: Microstructure of the occlusal repair: heat affected zone

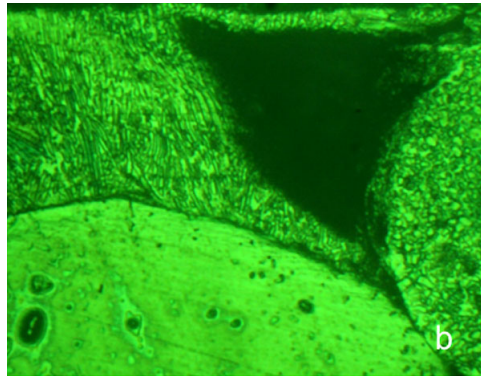


Fig. 7b: Microstructure of the occlusal repair: weld area

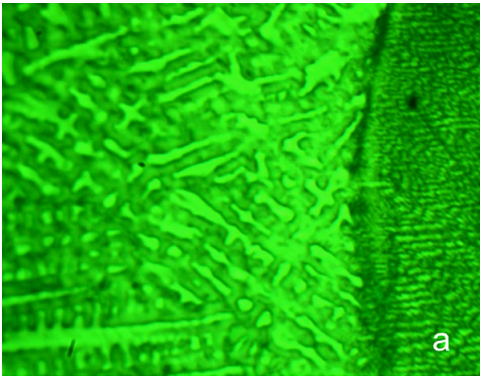


Fig. 8a: Microstructure of the contact area build-up: heat affected zone

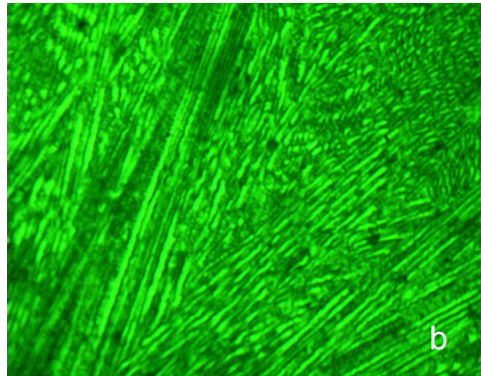


Fig. 8b: Microstructure of the contact area build-up: weld area

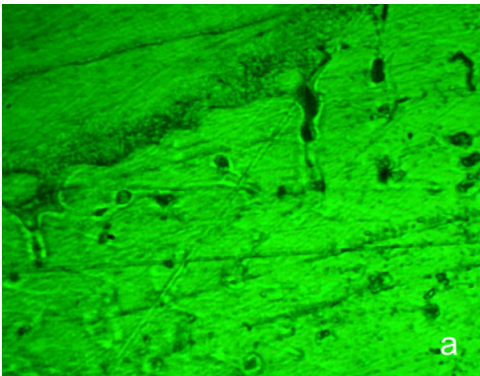


Fig. 9a: Microstructure of the marginal extension: heat affected zone

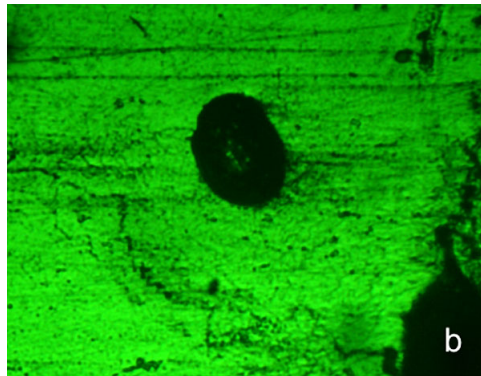


Fig. 9b: Microstructure of the marginal extension: weld area

Conclusions

Minor defects of cast restorations are suitable for correction, by welding with filling material and the used time is much more reduced than those needed for restoration renewal are.

Literature

1. Rosenstiel S, Land M, Fujimoto J.: Contemporary fixed prosthodontics, 3rd ed., Mosby, St. Louis, 2001.
2. Sandu L., Borțun C., Pop D., Negruțiu M.: Tehnologia restaurărilor protetice fixe unidentare, Îndreptarul de lucrări practice; Lito UMFT, 2006.
3. Leretter M., Sinescu C., Sandu Liliana, Lakatos S.: Curs de tehnologie a protezelor fixe, vol I, Bazele tehnologiei protezelor fixe, Lito UMFT, 2002.
4. Sandu L, Birdeanu V, Borțun C, Matekovits G.: A fémvázás részleges fogsorok ötvözetének hegesztése puzáló lézernyalábbal, A Fogtechnika - das dental labor, 2006, 1:42-4.
5. Bertrand C, Le Petitcorps Y, Albingre L, Dupuis V.: The laser welding technique applied to non precious dental alloys procedure and results, British Dental Journal, 2001, 190(5):255-7.
6. Burkhardt H.J.: Ein wirtschaftlicher Weg mit Erfolgchancen - Schweißen mit dem CeHa Phaser MX1, Quintessenz Zahntech, 2005, 31(2):136-42.

This Poster was submitted by Assist. Prof. Dr. Sorin Porojan.

Correspondence address:

Assist. Prof. Dr. Sorin Porojan

"Victor Babes" University of Medicine and Pharmacy Timisoara
University School of Dentistry
2 L. Blaga Str., App. 5
code 300002, Timisoara, Romania

CAST DENTAL RESTORATIONS MODERN REPAIR POSSIBILITIES

Sorin Porojan*, Liliana Sandu, Cristina Borțun, Florin Topală

Department of Prostheses Technology, Specialization Dental Technology, University School of Dentistry, "V. Babeș" University of Medicine and Pharmacy Timișoara

Background:

In classical conditions some lack of substance defects of cast restorations need their renewal, but modern techniques of dental alloys welding in protective gas shield allow correction of these defects, without repeating all of the clinical and technical stages.

Objective:

The aim of the study was to test microplasma welding possibilities of cast dental restorations.

Materials and methods:

Different Ni-Cr cast restorations with defects were chosen in order to add proximal contacts, to repair casting voids and to lengthen short cast crowns (Fig. 1-3) using microplasma welder (Schütz Dental, Rosbach, Germany). As filler material a Ni-Cr wire Wirroweld NC (Bego, Bremen, Germany) was selected. The optimal welding parameters were correlated with the defect type, size, and working stage.

If these marginal discrepancies are minor and if cast the piece correctly adapts to the axial, proximal and occlusal and there are no other casting defects, they can be repaired by welding with filler material.

Nondestructive and destructive analyses tested the welding quality.



Fig. 1. Lack of substance defect on restoration



Fig. 2. Undersized contact area



Fig. 3. Marginal lack of substance defect on restoration



Fig. 4. Filling of the internal absence by welding



Fig. 5. Rebuilding of the contact area by welding with filling material



Fig. 6. Extension of the cast restoration margin by welding with filling material

Conclusion:

Minor defects of cast restorations are suitable for correction, by welding with filling material and the used time is much more reduced than those needed for restoration renewal are.

Results:

The welding parameters were determined for each defect type. Pores and holes defects repairs (Fig. 4) were made using the following welding parameters: power step 6 and pulse delay 35 ms both for deposition and for surface fining. Undersized contact areas were corrected by welding with filler material (Fig. 5) using the parameters: power step 6 and pulse delay 30 ms for deposition and power step 7 and pulse delay 35 ms for surface fining. The used parameters for minor marginal discrepancies (short restoration) (Fig. 6) were: power step 3 and pulse delay 25 ms for wire fixing, deposition of filler material and fining.

An adequate combination of them allowed to obtain optimal repairs. These were proved by testing methods (Fig. 7-9).



Fig. 7. Microstructure of the occlusal repair. a: heat affected zone, b: weld area.

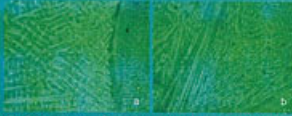


Fig. 8. Microstructure of the contact area build-up. a: heat affected zone, b: weld area.

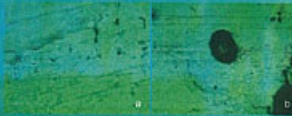


Fig. 9. Microstructure of the marginal extension. a: heat affected zone, b: weld area.

References:

1. Rosenfeld S, Land M, Fugere J. Contemporary fixed prosthodontics, 3rd ed. Mosby, St. Louis, 2001.
2. Sandu L, Borjan C, Pop D, Neacșu M. Tehnologii restaurative în practica firei uzinate. In: Dicționar de lucrări practice. Lito LMI T, 2006.
3. Lăteanu M, Sinescu C., Sandu Liliana, Leleșcu S. Curs de tehnologie a protazelor fixe, vol I. Bazele tehnologiei proteluziei fixe. Lito LMI T, 2002.
4. Sandu L, Borțun C, Borjan C, Mădăruș G. A firmă laser rezolvă problemele de restaurare în practica firei uzinate. A Proiectului de cercetare științifică, 2006; 1:42-4.
5. Brattland C, Le Pentecoste Y, Almgren I, Dupuis V. The laser welding technique applied to non precious dental alloys: procedure and results. British Dental Journal, 2001; 190(5):255-7.
6. Borchardt H J. Ein wissenschaftlicher Weg zum Erfolg: Schweißen mit dem Celli Pläsmar MXI. Quasitronica Z. Schweiß, 2005; 31(2): 136-42.

Acknowledgements: This study was supported by the Grant CNCSIS (LE 2007) from the Ministry of Education, Research and Youth.