Digital workflow to perform esthetic and functional rehabilitation of oligodontia with occlusal veneers and implant supported crowns, case report.

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Abstract

Background. Agenesis of teeth is one of the most common of human developmental anomalies. Multidisciplinary treatment approach calls for pre-prosthetic orthodontic space opening for proper positioning of the missing teeth and correction of inter-maxillary relations.

Methods. A 23-year old girl presented with oligodontia and no stable occlusion in premolar, molar region. Two years of orthodontic treatment created space for implant placement but stable occlusion could not be achieved. Diagnostic wax-up was made on casts mounted on articulator programmed to individual patient parameters. Optical impression (TRIOS 3, 3Shape, Denmark) of prepared teeth scan was aligned under prepreparation scan of mock up. Following stabilizing occlusion with hybridceramic veneers (Vita Enamic, Vita Zahnfabrik, Germany), digital workflow was used for fixed implant rehabilitation.

Results. A prosthetic-driven backward implant planning and guided implant placement (AstraTech EV Implant System, diameter 3 mm, DentsplySirona Implants, Sweden)(SMART Guide, dicomLAB, Hungary) was performed. After 3 months optical impression was carried out to detect 3D implant position to digitally design temporary crowns and soft tissue conditioning was done slightly by flow resin composite. After creating harmonious supraimplant emergence profile intraoral scan was taken and customized titanium-nitride abutments and milled zirconia cut-back crowns (Atlantis, Dentsply Sirona Implants, Sweden) were delivered. Model manufacturing was performed using a 3D printer and screw retained veneered ceramic crowns attached to implants.

Conclusions. This article describes a conventional protocol for creating a mock up and digital workflow of occlusal veneers and implant supported crowns for predictable esthetic and reliable functional result.

Introduction

Oligodontia is the congenital agenesis of 6 or more permanent teeth. Multidisciplinary treatment approach calls for pre-prosthetic orthodontic space opening for proper positioning of the missing teeth and correction of inter-maxillary relations. High-quality CAD/CAM materials processed by digital workflow offer predictable and reliable treatment options for surgical and prosthetic phases of therapy.

A 23-year old girl presented with oligodontia and no stable occlusion in premolar, molar region. Two years of orthodontic treatment created space for implant placement but stable occlusion could not be achieved. Mixed digital-analog workflow was used to restore occlusion and replace missing teeth.
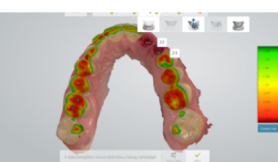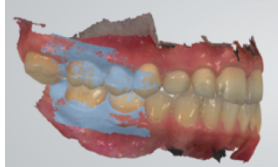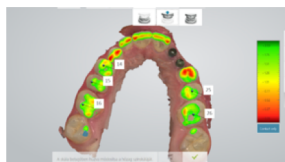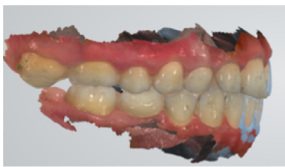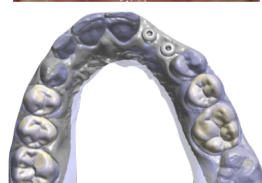
Materials & Methods

Wax-up was made on casts mounted on articulator (Kavo Protar 5B, Kavo Dental Gmbh, Germany). A transparent silicon key was fabricated on wax-up and filled with flowable composite to place on unprepared teeth with spot etching. Occlusal adjustments were made according to individual patient movements. Optical impression (TRIOS 3, 3Shape, Denmark) was taken as prepreparation scan to record occlusal morphology. Mock-up served as a guide to follow a minimal invasive preparation approach of 1mm for hybridceramic (Vita Enamic, Vita Zahnfabrik, Germany) occlusal veneers. Prepared teeth scan was aligned under prepreparation scan and fit to occlusal morphology was applied in CAD softwer (DentalDesigner, 3Shape, Denmark). Milled hybridceramic occlusal veneers were individualized and adhesively cemented. A prosthetic-driven backward implant planning and guided implant placement was performed. After 3 months of implant healing optical impression was carried out to detect 3D implant position to digitally design temporary crowns (Vita CadTemp, Vita Zahnfabrik, Germany) and soft tissue conditioning was done slightly by flow resin composite.

Results

After creating harmonious supraimplant emergence profile intraoral scan was taken of temporary restoration, emergence profile and scanbody. STL files were placed on web-based order system, design was viewed and edited prior to milling and customized titanium-nitride abutments and zirconium-dioxide cut-back crowns (Atlantis, Dentsply Sirona Implants, Sweden) were delivered. Model manufacturing was performed using SLT technique (MediTech D30 printer) to perform veneering of screw retained ceramic crowns.
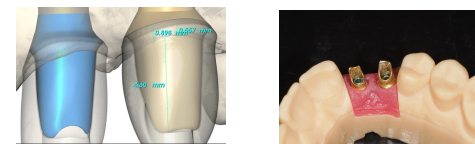
Conclusion

Analog wax up and individual adjustment of mock up created proper occlusion that was copied through digital workflow to milled occlusal veneers. CAD/CAM produced custom implant-abutments and cut-back crowns were hand-layer-veneered by ceramic to achieve natural esthetic. Mixed conventional - digital workflow resulted in predictable outcome to restore function and esthetics.

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