Proximal Contacts:
The Key to Optimizing Fit and Reducing Complications

Emil L.A. Svoboda Ph.D.; D.D.S. Tamari Matsaberidze D.M.D.

INTRODUCTION

Introduction: A Review by Lee et al. 2017 indicates that 67% of implant patients can expect to suffer the consequences of peri-implant disease and 14% will suffer implant loss. Thus, a glaring 81% of implant patients can expected to experience serious treatment complications.

Loose contacts or contact loss due to drifting of natural teeth has been identified as a complication that can cause problems related to food impaction, formation of black triangles and increased periodontal and peri-implant problems. Loose contacts often require remedial activities by the dentist and the dental laboratory. Current studies show that tooth drift can cause open contacts in 34% to 66% of the cases after an implant restoration has been placed adjacent to a natural tooth. **Tight contacts** can be uncomfortable for the patient and can prevent the dentist from optimally seating a prosthesis or its attached components onto retainers in the mouth. Both loose and tight contacts are risk factors for peri-implant disease. (Heitz et al. 2017)

MATERIAL & METHODS

The authors reviewed Dr. Svoboda's research and literature review at www.ReverseMargin.com to identify the root causes of poor contacts, define their relationship to treatment complications and to determine a way to optimize proximal contacts to make treatment safer for patients.

The **root causes of poor proximal contacts** are Prosthesis Dimensional Error (PDE) and the Tissue Effects: Resistance To Displacement Effects (RTDE) and the Gingival Effects (GE). (see Terminology article) These are the reasons dentists must adjust a prosthesis in the mouth during its installation. Mitigating the negative effects of these root causes of complications can prevent implant-abutment misfits, open and overhanging margins and residual subgingival cement.

According to the literature, Interproximal Contact Loss occurs as early as 3 months after prosthetic restoration, generally on the mesial side of the restoration. The occurrence of an interproximal separation next to an implant restoration is greater than anticipated. It appears that force vectors cause tooth movement and an implant functions like an ankylosed tooth. Orthodontic forces represent a major inducing factor for tooth movement. Varthis S, Tarnow DP, Randi A. 2018

Excessive or inadequate orthodontic forces exerted on contacts during the installation of an implant crown or bridge could provide a reason for 30% of the natural teeth moving away from installed implant crowns and bridges and causing open contacts that can cause food impaction and dental peri-implant and periodontal disease.

DISCUSSION

When abutments are installed individually, without the prosthesis attached, the dentist has the best chance to optimize their fit. The abutments are free to move in 3-dimensions and align themselves optimally with their intended implant connectors. The dentist's visibility is also better than it would be if the prosthesis were attached, and there are no tight proximal contacts to push them off their intended implant retainers.

Fig 1 shows how an abutment can align itself optimally with an angled implant when it is not restricted constrained within a prosthesis and there are no tight contacts to push it off its intended retainer. Once torqued into place the abutment connection will not be disturbed by a tight contact.

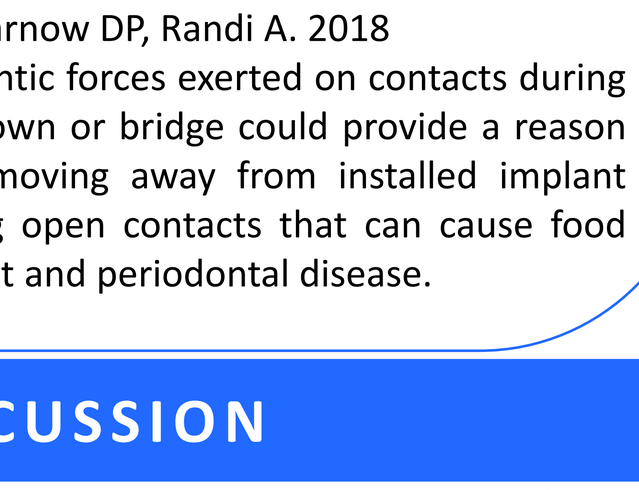

Fig 1

DISCUSSION continued

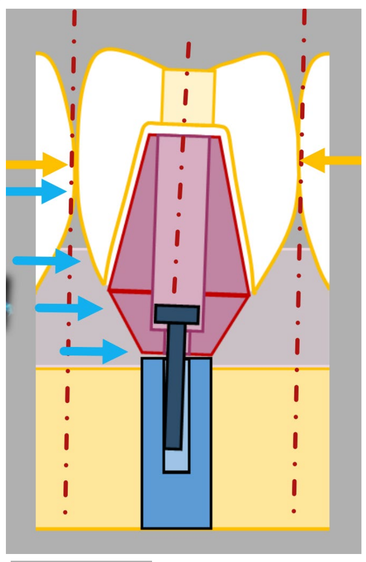
Fig 2

Fig 2. shows how snug contacts with adjacent teeth can prevent the optimized seating of the implant-abutment connection. Tightening the abutment screw may somewhat upright the abutment-crown complex and cause a tight and loose contact. The tight contact may apply sufficient orthodontic-like force to the adjacent tooth to move it away from the implant crown. While tightening the abutment screw may increase the force against the tight side contact, the contact on the other side can become loose or open. The tight contact and adjacent tissues can cause an implant-abutment misfit.

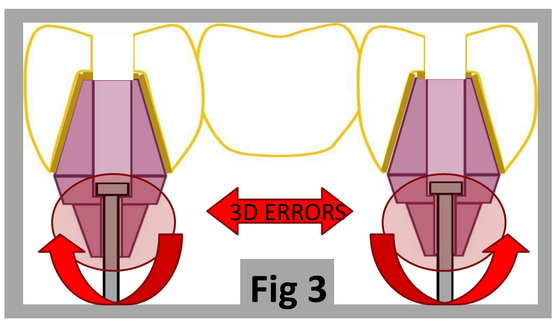

Fig 3

This problem becomes worse with multi-unit prosthetics because their abutments are constrained within the prosthesis. **Fig 3**. Even without a tight contact to complicate the seating of the prosthesis, this case is doomed to expose the patient to the dreaded implant-abutment misfits. **Fig 4.**

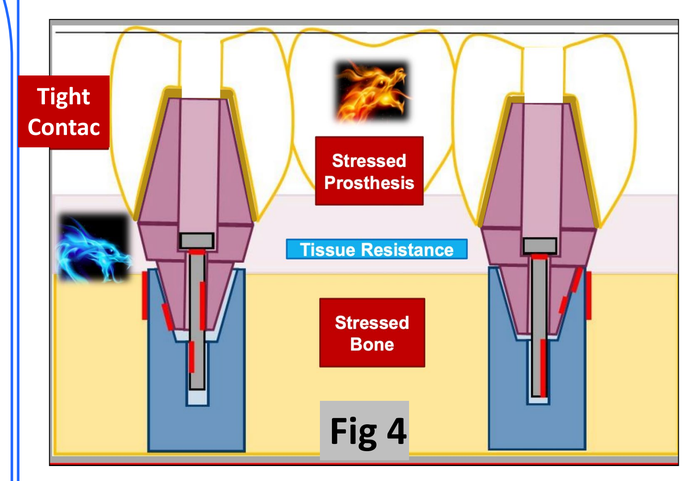

Fig 4

Once the implant-abutment connection is optimized the challenge to tolerate expected PDE moves to the abutment-prosthesis connection.

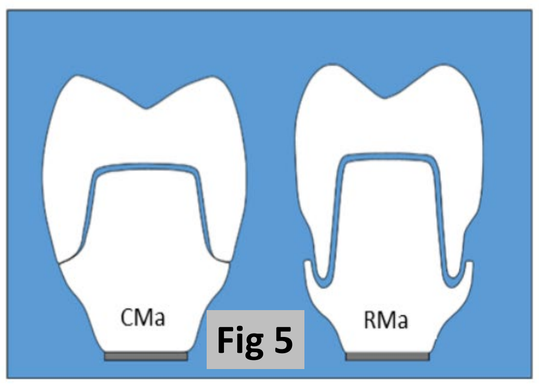

Fig 5

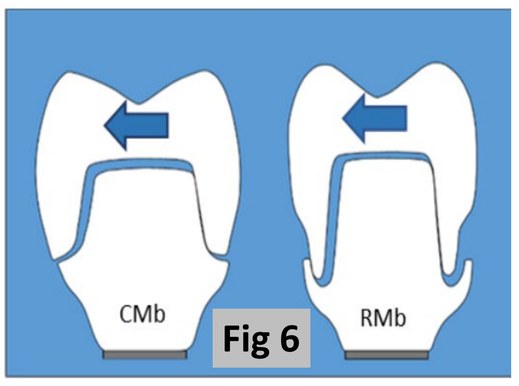

Fig 6

Fig 5 is an illustration of a Chamfer Margin based abutment-crown System (CMa) next to a Reverse Margin System (RMa). The CMa is designed to touch the abutment when seated, unlike the RMa. **Fig 6** illustrates how a tight contact can shove the CMb crown laterally to cause an open margin on its right side and an overhanging margin on the left. The RMb is designed to safely tolerate expected PDE without causing open and overhanging margins. Research shows that this RMa design also prevents submarginal cement, is self centering during installation without traumatizing gingiva during the contact adjustment process. It thus makes it easier for the dentist to do a great job for the patient.

CONCLUSIONS

This poster presentation shows how to optimize the implant-abutment connection by installing abutment individually, thereby avoiding the negative effects of Prosthesis Dimensional Error and related tight contacts. It illustrates how tight proximal contacts and non-ideal alignment of abutments constrained by their prosthesis can frustrate the dentist's ability to optimize their connection to multiple implant retainers. It shows how the Chamfer Margin System is not designed to tolerate expected Prosthesis Dimensional Error and the Tissues Effects while the Reverse Margin System is.

Presented at the 98th Annual Session of the Greater New York Dental Meeting in 2022