

Early View Article: Online published version of an accepted article before publication in the final form.

Journal Name: Journal of Case Reports and Images in Dentistry

Type of Article: Case in Images

Title: Prosthodontic Management of Deeply Seated with Severe Buccal Mal-alignment Dental Implant "A Case Report"

Authors: Adnan Abdullah Al-Fahd

doi: To be assigned

Early view version published: September 18, 2015

**How to cite the article:** Al-Fahd A A, Prosthodontic Management of Deeply Seated with Severe Buccal Mal-alignment Dental Implant "A Case Report". Journal of Case Reports and Images in Dentistry. Forthcoming 2015.

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6 **AUTHORS:**

7 Adnan Abdullah Al-Fahd<sup>1</sup>

8

9 **AFFILIATIONS:**

10 <sup>1</sup>Prosthodontics Department, Faculty of Oral and Dental Medicine, Cairo University,  
11 Assistant Lecturer, Department of Prosthodontics, Faculty of Oral and Dental  
12 Medicine, IBB University, IBB, Yemen. BDS, MDS, PhD(c).

13

14 **CORRESPONDING AUTHOR DETAILS**

15 Adnan Abdullah Al-Fahd

16 2 Ali Attia Street Hadayek Almaadi Appartment No.8 Cairo

17 Cairo, Cairo, Egypt, 11745

18 Phone number: 00201142228430

19 Email: [dradnan2012@gmail.com](mailto:dradnan2012@gmail.com)

20

21 **Short Running Title:** A Novel Method to Restore Deep Mal-Aligned Single Implant

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23 **Guarantor of Submission:** The corresponding author is the guarantor of  
24 submission.

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## 35 **ABSTRACT**

### 36 **Introduction**

37 Misaligned implant present a prosthetic challenge especially when accompanied with  
38 malposition. Sometimes such complex cases remain without restoration even if  
39 they were properly Osseointegrated. The fixed prosthesis which is the most  
40 acceptable option by the patient can be achieved by appropriate procedure as  
41 explained in this report to achieve a fixed prosthesis for such complex cases.

### 42 **Case report**

43 In this case report a novel method to provide a fixed prosthetic restoration for a  
44 complex severe buccal inclined with severe deep positioned implant was explained.

### 45 **Conclusion**

46 The use of Octa abutment with UCLA abutment is successful treatment option for  
47 complex malaligned- malposed single dental implant.

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49 **Keywords:** Dental implant, malposition, misalignment, UCLA abutment.

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## 66 **INTRODUCTION**

67 The implant restoration is very predictable treatment in dental fixed restoration.  
68 However, implant placement need many requirements to be restored including  
69 proper implant position and angulation within alveolar ridge.

70 Surgically driven implant concept which depend mainly on the present of adequate  
71 bone amount for implant insertion is no longer used nowadays. This concept  
72 usually result in implant that is prosthetically challenge or even impossible to  
73 restored resulting actually in failed implant. Prosthetic managements for these cases  
74 with misaligned and/or malposed implant are usually present challenge for both  
75 prosthodontist and technician [1–3].

76 By the time many techniques are present to overcome such complications including  
77 angulated abutment, UCLA abutment or in severe cases removable prosthesis.  
78 However, the fixed restoration in these cases is mainly restricted to solve the  
79 maligned cases within limit not exceed than 30 degree. Furthermore, removable  
80 prosthesis is not practical for single missing tooth in addition to be objectionable by  
81 many patients [4,5].

82 Consequently, regarding a severe angulated implant that accompanied with severe  
83 deeply positioned implant the prosthetic restoration is still a challenge up to date  
84 [1,6–8].

85 In this case report a simple predictable prosthetic procedure to restore a severe  
86 maligned accompanied with deeply positioned single implant was described.

87

## 88 **CASE REPORT**

89 A 52 years old female patient presented to Prosthodontic Department of Faculty of  
90 Oral and Dental Medicine, Cairo University with deeply seated and buccal mal-  
91 aligned single implant at upper right 2nd premolar area need fixed prosthodontic  
92 restoration. Upon thorough clinical and panoramic radiographical examination the  
93 implant was deeply seated (Figure 1) with slight inflammation for the overlying soft  
94 tissue leading to patient discomfort with slight pain during eating. Also, the adjacent

95 first right premolar is endodontically treated with previous preparation without crown  
96 that need crowning at the same time.

97 The treatment plan was made to overcome the two complex obstacles including  
98 deep seating and buccal mal-aligned implant that prevent prosthetic restoration with  
99 standard abutment. At the beginning chlorhexidine mouth wash and augmentin  
100 antibiotic was described for one week to resolve the presence soft tissue  
101 inflammation.

102 After one week crestal incision was made at upper right 2nd premolar area over the  
103 implant with slight extension on the buccal side both anteriorly around canine and  
104 posteriorly around second premolar. Then slight soft tissue reflection was made by  
105 using periosteal elevator until implant platform was reached.

106 Octa abutment was connected to implant fixture and tightened properly by Octa  
107 driver and torque wrench up to 35 Newton. Hygienic screw was placed over the Octa  
108 abutment and left for two weeks.

109 After two weeks the hygiene covering screw was removed and impression post was  
110 connected to Octa abutment to take abutment level final impression using open tray  
111 impression technique (Figure 4). Then the medium body Poly vinyl siloxane was  
112 mixed and a special tray was loaded and 20cc syringe also used to dispense small  
113 amount around impression post simultaneously. After material setting, a special tray  
114 was removed and checked for all required details (Figure 2).

115 Abutment analogue was tightened to impression post ensuring immobility of the  
116 impression post during this process. Then a soft tissue mimic material was applied  
117 around gingival part of analogue and the whole impression was poured with  
118 improved stone.

119 UCLA abutment was used in this case over the octa abutment to correct the severe  
120 buccal mal-alignment of implant. When the angulation was corrected the UCLA  
121 abutment casting performed. After casting final adjustment was performed by  
122 milling machine.

123 The angulation in this case was severe so it is impossible to use a UCLA abutment  
124 as screw retained as the screw hole would be at buccal side which be unaesthetic.  
125 Instead this case was planned to be considered as cemented retained case.

126 After correction the deeply seated position and severe angulation, the finished UCLA  
127 abutment was connected to substructure Octa abutment at proper direction by  
128 tightening the abutment screw adequately up to 35 newton using torque wrench  
129 (Figure 3).

130 When UCLA abutment was satisfied regarding the position, direction, stability of  
131 connection, confirmation for complete seating was made by taking periapical  
132 radiograph (Figure 4).

133 Finally, after correction of angulation the porcelain fused to metal crown was  
134 constructed over the UCLA abutment as cement retained restoration. Also the  
135 adjacent first premolar was endodontically treated tooth and require crowning which  
136 performed by taking direct rubber impression impression and complete the ordinary  
137 steps of porcelain fused to metal restoration(PFM) but this crown was made as a  
138 separate unite not connected to the adjacent implant restoration. The final PFM  
139 crown was inserted and collusion was checked and adjusted to ensure implant  
140 crown in only contact in maximum biting force. Finally crown was cemented with  
141 glass ionomer cement (Figure 5). After 12 month follow up reveal a proper clinical  
142 and radiographical outcomes with high patient satisfaction (Figure 6).

143

## 144 DISCUSSION

145 The deeply seated implant present one of the most challenge cases for the clinician  
146 especially if combined with wrong angulation like in this case. The surgeon who  
147 place the implant deeply because of severe bone resorption at this area and he  
148 make severe buccal angulation to avoid maxillary sinus perforation [1, 5].

149 The antibiotic and mouth wash were described at the beginning promote soft tissue  
150 healing and resolve the present infection [9].

151 The other suggested solutions for these case including removable prosthesis,  
152 leaving implant without restoration or implant removal. However, the fixed option for  
153 this case is more comfortable to patient than removable option which described by  
154 some author [10].

155 Because of deep position and severe buccal angulation of implant in this case, there  
156 is no standard abutment could be useful in this case. Also a castable abutment alone  
157 could not fulfill this requirement.

158 Consequently, a novel technique was used in this case by dividing the prosthetic part  
159 into two parts: first part to overcome the deep position by using Octa abutment that  
160 was terminated nearly at the gingival margin that allow soft tissue seal(cuff) to  
161 formed around it. The second part, to overcome the severe buccal angulation by  
162 UCLA abutment that be made to accommodate he proper angulation firstly by plastic  
163 removal during wax up procedure and secondly by metal milling after casting  
164 procedure.

165 As the screw hole would be at the buccal side of the future crown, the screw retained  
166 prosthesis was inappropriate option due to esthetic issue. To resolve this problem  
167 the case was converted to cemented retained restoration.

168 The adjacent tooth was restored with separate PFM crow not connected to implant  
169 to avoid the possible complication that may arise from natural tooth-implant  
170 connection as tooth intrusion [11].

171 The post operative 12 months follow up reveal a good clinical and radiographical  
172 results regarding peri-implant soft and hard tissue with optimum patient satisfaction.

173

#### 174 **CONCLUSION**

175 This case report present a simple novel technique to restore a single implant with a  
176 severe deeply positioned with a severe buccal angulated implant. This technique is  
177 reliable with a satisfy results for both clinician and patient after one year.

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#### 179 **CONFLICT OF INTEREST**

180 No conflict of interest.

181

#### 182 **AUTHOR'S CONTRIBUTIONS**

183 Adnan Al-Fahd

184 Substantial contribution for all steps necessary during the preparation of this case  
185 report.

186

#### 187 **ACKNOWLEDGEMENTS**

188 I would like to thank Dr. Amr Hosni Elkhadem for his valuable support in the  
189 practical part of this case.



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## 241 **FIGURE LEGENDS**

242 Figure 1: Preoperative panoramic radiograph reveal deep implant without covering  
243 screw.

244 Figure 2: A) Impression post attached to Octa abutment to take abutment level  
245 impression. B) Open tray abutment level final impression

246 Figure 3: (A) after casting and correction of malalignment. B) Final position of UCLA  
247 abutment intraorally (lateral view).

248 Figure4: Periapical radiograph for Octa abutment with UCLA abutment

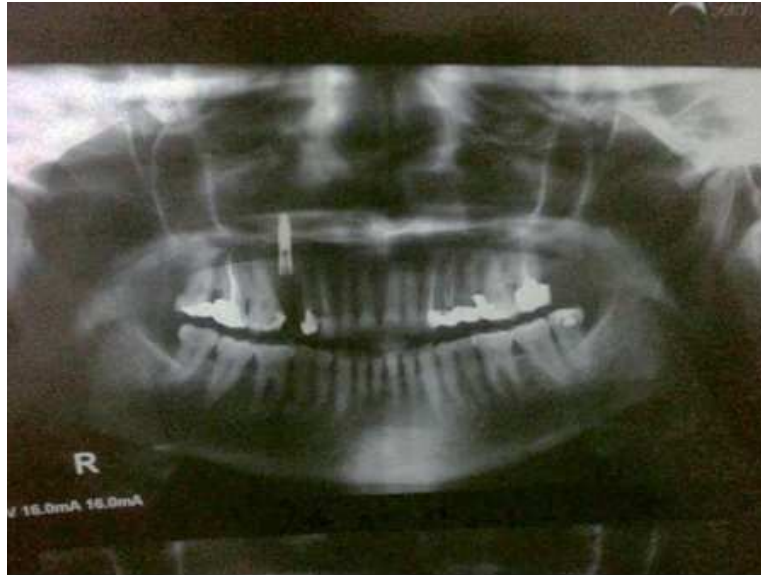
249 Figure 5: A) final separate 2 PFM crowns on the cast. B) PFM cemented inside the  
250 mouth.

251 Figure 6: 12 month's post-operative radiograph.

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253

254 **FIGURES**

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257 Figure 1: Preoperative panoramic radiograph reveal deep implant without covering  
258 screw.

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284 Figure 2: A) Impression post attached to Octa abutment to take abutment level  
285 impression. B) Open tray abutment level final impression

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Figure 3: (A) after casting and correction of malalignment. B) Final position of UCLA abutment intraorally (lateral view).



Figure4: Periapical radiograph for Octa abutment with UCLA abutment

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Figure 5: A) final separate 2 PFM crowns on the cast. B) PFM cemented inside the mouth.



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328 Figure 6: 12 month's post-operative radiograph.

EARLY VIEW