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Clinical efficacy of the BellaTek® Encode® impression system – a case-control-study of three impression techniques

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Topic: Implant therapy outcomes, prosthetic aspects

Introduction

Implant registration using conventional impression copings can be a cumbersome process, requiring multiple component swaps, during which registration errors can accumulate. The BellaTek Encode impression system simplifies the process of identifying fixture-level information required for designing and fabricating patient-specific definitive abutments.

Objective

To quantitatively evaluate the success rate of patient-specific abutments and restorations utilizing the BellaTek Encode impression system (both physical impression and intraoral scan-based) compared to conventional fixture-level impressions.

Materials and Methods

Between June 2012 and December 2013, 839 partially edentulous patients, representing a total of 1.114 implants and 1.007 restorations, were restored with patient-specific abutments/restorations. Three different techniques were applied to register the implant position: Test-a (n = 564) received BellaTek Encode (BIOMET3i, Palm Beach, FL, USA) healing abutments, over which a conventional impression was taken; test-b (n = 132) also received a BellaTek Encode healing abutment, which was then scanned intraorally. Unique codes on these abutments' surface relay abutment emergence profile and implant platform information useful in CAD/CAM abutment design and milling. The control group (n = 311) used conventional fixture-level impression copings from any of ten different implant manufacturers. All fabrication steps were carried out in one single dental laboratory. At time of restoration delivery, the abutments as well as the crowns/bridges were checked for occlusion, marginal fit and contact points (occlusal, interproximal). The case was deemed clinically acceptable if it was not returned to the laboratory for adjustment and/or remake.

Results

Overall, 41 restorations required correction in the laboratory. Interproximal adjustments were the primary form of restorative modification (23 restorations), followed by occlusal adjustments (10 restorations); frameworks did not fit properly in only 5 cases; margin adjustments were required for 3 cases; in one case incorrect components were used. (A restoration may have required more than one type of adjustment.) The control and two test groups showed comparably high clinical acceptability (Test-a: 95.6; Test-b: 97.0%; Control: 96.1%; $p > 0.05$). A Fisher's exact test to compare the proportions of test-a compared to the control provides a p value of 0.730, and p=0.787 for test-b compared to the control. The data are consistent with the null hypothesis that the population proportions are equal for the two test groups compared to the control, meaning that no significant difference could be detected between the groups.

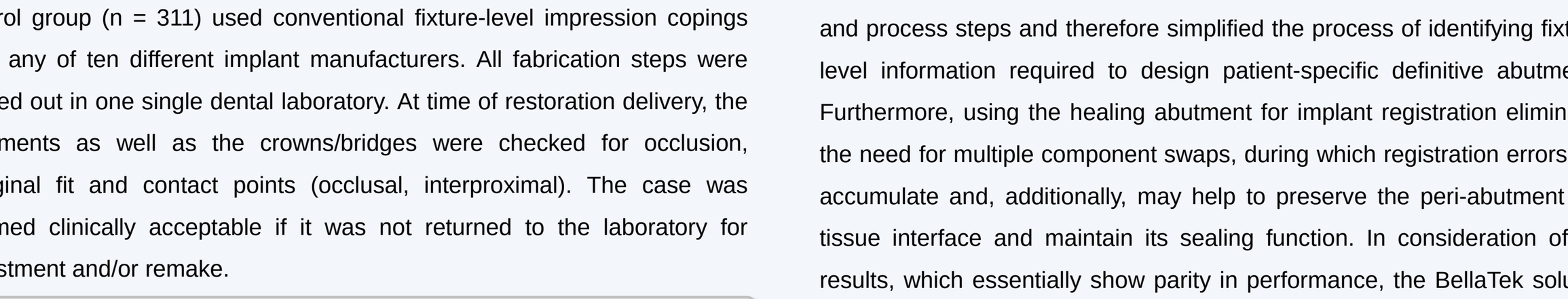
	n (total)	n (adjustment)	% (adjustment)
Test-a (Encode/impression)	564	25	4.4
Test-b (Encode/scanner)	132	4	3.0
Control (fixture level)	311	12	3.9

Table: Incidence of adjustment for each group

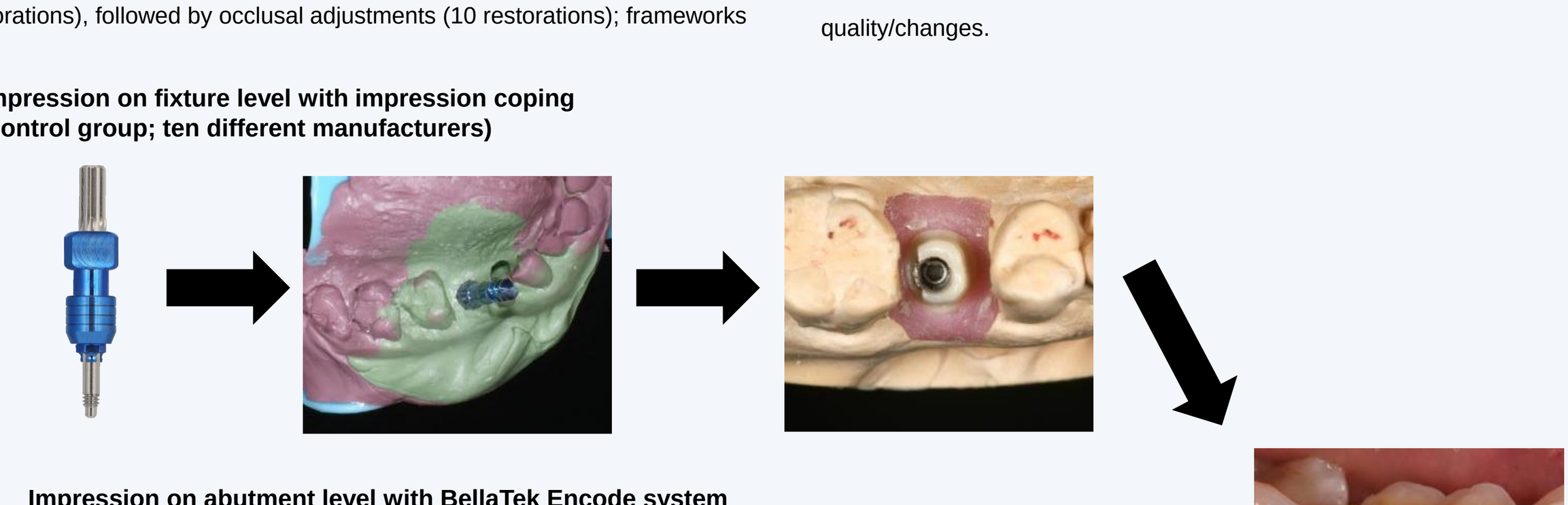
Conclusions

All three impression techniques produced similarly high rates of clinically acceptable restorations and, thereby, only a minimal need for adjustments of restorations was reported. Within the limitations of this case-control-series, the unique BellaTek Encode impression system requires less components and process steps and therefore simplified the process of identifying fixture-level information required to design patient-specific definitive abutments. Furthermore, using the healing abutment for implant registration eliminated the need for multiple component swaps, during which registration errors can accumulate and, additionally, may help to preserve the peri-abutment soft tissue interface and maintain its sealing function. In consideration of the results, which essentially show parity in performance, the BellaTek solution offers beneficial attributes that make it the preferred restorative protocol. Prospective, randomized, controlled clinical trials with a strict prosthetic and follow-up regimen can further evaluate the BellaTek Encode impression system in regards to prosthetic accuracy and peri-implant soft tissue quality/changes.

Impression on fixture level with impression coping (control group; ten different manufacturers)



Impression on abutment level with BellaTek Encode system (Test-a: conventionell silicone impression / Test-b: intraorally scanned)



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