British Institute
of Dental & Surgical
Technologists

CPD Article

ISSUE 33

Proud of our History, Looking Forward to the Future

BIDST CPD

This learning session has been judged as being equivalent to one hour of verifiable CPD. To claim your verifiable CPD you will need to answer the questions at the end of this article and submit them either by email to secretary@bidst.org or by post to the BIDST Membership Office 44-46 Wollaton Road, Beeston Nottingham NG9 2NR. You will also need to keep a copy of the article together with your feedback sheet and certificate for revalidation.

1hr

Verifiable CPD

Ref No. 39/02/02

The Art of Abutment Selection

Learning Objectives

By reading this article you will learn:

This article will guide technicians in understanding the need to use original implant components to meet the GDC standards for the dental team without compromising patient well-being when selecting implant abutments.

Larry Browne DCP, ITI Fellow discusses the reasons why technicians should carefully consider their choice of implant abutment.

Implant supported restorations are certainly here to stay and any practice or laboratory wishing to continue to be successful will need to incorporate an implant service option. Indeed there are a great many operators rushing into the market place, attracted by the simplicity of modern systems on offer and potentially simple technology. But is the reality as the marketing departments would have us believe? Or are there perhaps some complications that may turn up to undermine our newly-found confidence?

There is much to learn in implant dentistry, particularly if you are working with multiple systems and all their options for hardware components. Undoubtedly the very best guarantee of trouble-free restoration is a thorough knowledge of the system and its requirements and protocols, and applying them to your work. Unfortunately there is a growing trend within our world for using third party CADCAM solutions or copy components, which are not in any way researched or indeed independently tested.

Original Components

While it may appear convenient or money saving to use third party component options, the integrity of fit and the load bearing potential has been shown, in several studies, to be lamentably poor. In a published study 1: Seong Kyun Kim et. Al. Inter. J of Maxillofacial Implants 2012:27:42:47, comparing three copycat systems against an original abutment, two of the copies fractured during the loading tests and all three copies fell very short indeed of a trouble-free expectation. Another study: 2. Michel Gigande et.al.Clinical Implant Dentistry Relat. Res. E published, recommended that copy abutments should not be considered as they seem not to perform as the original abutment to original implant comparison. Initially, of course, all of the copies appeared to be very similar to the original and to the naked eye seemed good enough to use.

Fig 1 illustrates screw-loosening with interchangeable abutments in internally connected implants after cyclic loading. Kim et al. Int J Oral Maxillofac Implants 2012; 27:42–47.

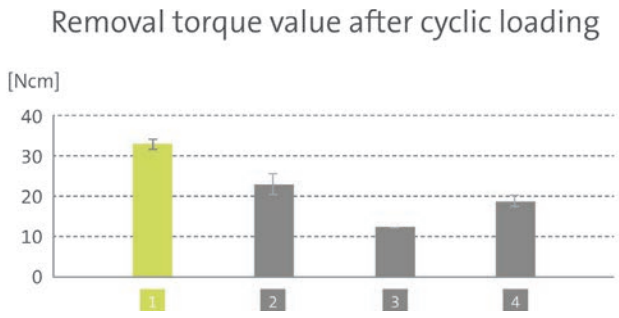

Fig 1.

1 Straumann® SLA® RN 4.1 – Straumann® Solid abutment

2 Straumann SLA® RN 4.1 – Lifecore® Biomedical Restore, Inc RDS COC abutment

3 Straumann® SLA® RN 4.1 – Neobiotech® Neoplant solid abutment

4 Straumann® SLA® RN 4.1 – Osstem AVANA solid abutment

The abutments were connected to the implants at 35

Ncm before loading. The original Straumann connection shows the highest removal torque* after cyclic loading reflecting the smallest effect of screw loosening. *Results for Straumann abutments on Straumann implants are statistically different from those with non-original parts.

Conclusion: Although different abutments are interchangeable with each other, they possess different chemical compositions and physical characteristics. The use of an abutment and implant manufactured by the same company is recommended to prevent the loosening of the abutment screw.

The trouble is that without scientific testing equipment the clinician or technician cannot possibly know the validity of the copy systems and as such should, in my opinion, not even think of using them. The main arguments are either cost savings or convenience, and despite the fact that any patient guarantee is immediately negated, many continue to ignore the patients' interests. Today as registrants of the GDC and the requirement for professional standards, many technicians, and indeed clinicians, who should know better, are completely discounting considerations such as patient interest and disclosure and instead are following the prices guide or the persuasive marketing hype.

CADCAM and Scanning Technology

Whilst using a scanner for a bespoke abutment has almost become the norm for many people, unfortunately none of the scanning companies are able to guarantee the integrity of the manufactured component for another system. This means that any breakdown will be the responsibility of the technician, who is, under the recent registration rules, responsible directly to the patient. What is worrying is that in many cases otherwise responsible and committed technicians are creating third party "copies" because they have invested in one manufacturer's scanning system to use as their CADCAM option without realising that their components will not and do not meet the criteria of other system manufacturers. This also negates any patient guarantees. Unless they have research data to support their choice, any failure will land on their doorstep and reflect a lack of professional standards, which might be of interest to the GDC.

Fig 2 illustrated the mean rotational misfit of Implants with original and non-original abutment connections*. Gigandet et al. Clin Implant Dent Relat Res. 2012 Jul 16

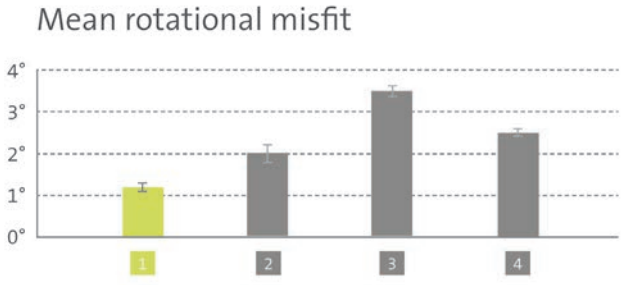

Fig 2.

1 Straumann® BL NC 3.3 Roxolid® – Straumann® CARES® Ti abutment

2 Straumann® BL NC 3.3 Roxolid® – Astra Tech ATLANTIS™ Ti abutment

3 NobelReplace® Straight™ 3.4 NP – NobelProcera™ Abutment Ti

4 Astra Tech OsseoSpeed™ TX 3.5 S – Astra Tech ATLANTIS ™ Ti abutment

The original Straumann connection shows the smallest rotational misfit**.

* For further results of the study see the original publication. ** All results are statistically different.

Conclusion: Non-original abutments differ in design of the connecting surfaces and material and demonstrate higher rotational misfit.

Some of the leading manufactures are trying to make access to original custom abutments easier for laboratories and Straumann have recently launch their Scan & Shape service to give all labs, and consequently dentists, the ability to produce a range of original custom abutments without the need to invest in scanning technology. The lab simply sends a model or waxed-up abutment with the required design specifications to Straumann, and based on this design, the lab will receive an original Straumann® CARES® Abutment.

Centrally milled Straumann® CARES® abutments are returned to the lab ready to prepare the final restoration, eliminating the need to use stock abutments that require modification. Additionally, Straumann® CARES® Abutments in Zirconium Dioxide allow direct veneering for screw-retained restorations and eliminate the need for additional copings.

This service provides custom abutments that achieve high-quality prosthetic outcomes using original components designed to achieve excellent performance of the implant-

abutment connection.

Thorough knowledge of your chosen implant system is essential to maximise the success of all your implant restorations and to help you discuss all the potential options with your clinical colleagues. Unfortunately many technicians are not keeping up to date with advances in implant abutment options and consequently choosing the familiar rather than the most suitable. The manufacturers are not stupid and are very well aware of the sensitivity to cost in the marketplace. Consequently in recent years many have added appropriate additional options, which do not undermine the protocols. The technician has a duty to be aware and up to date with such choices and in a position to offer them when required. I was recently involved in a project which compared the laboratory cost of an off-the-shelf option to the bespoke CADCAM or indeed the UCLA type abutment for a single cementable crown. The variation due to the choice of abutment alone was £172.00. This cost control is easily within the hands of the up-to-date and trained technician who is familiar with the abutment choices and able to select the most suitable and cost-effective option. Straumann have recently launched a very versatile and cost-effective abutment solution; the Straumann® Variobase™ Abutment, which should be of interest to any technicians seeking to use original components, whilst still maintaining cost control.

This new abutment can be used on either Bone level or Tissue level implants and delivers a highly cost-effective solution for screw- or cement-retained single crowns and cement-retained bridges. Consisting of a customised coping and a machined abutment with four cams to significantly enlarge the bonding surface, the final restoration of choice is bonded in the lab to the abutment with a high degree of accuracy, ready to be screwed in to place by the clinician.

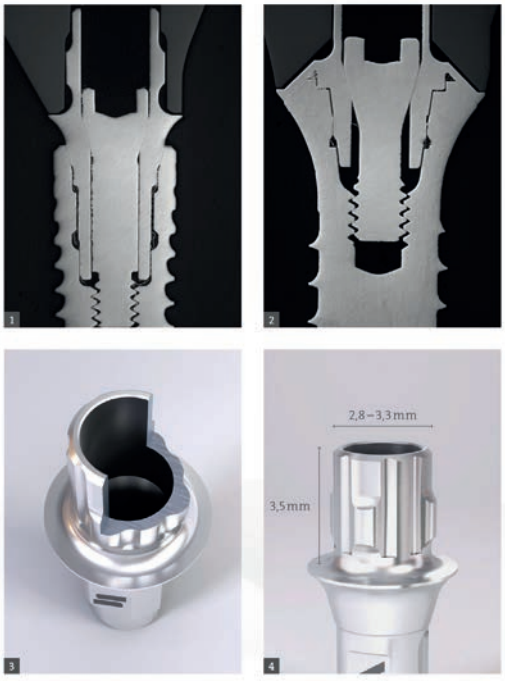

Fig. A) Comparing the rotational misfit between original abutments on original implants and non-original abutments on original implants.

Fig. 1: Straumann® Variobase™ Abutment with coping on Straumann® RC 4.1 implant

Fig. 2: Straumann® Variobase™ Abutment with coping on Straumann® WN 4.8 implant

Fig. 3 + 4: Enlarged bonding surface compared to cylindrical design allows the design to have minimal dimensions providing maximum design flexibility

Cost Comparison

The table below illustrates that it is possible to use original components and still maintain cost control.

Abutment Type	Cost
Straumann® Variobase Stock Abutment - Metal Coping	£88
Straumann® Variobase Stock Abutment - Digital Zirconia Coping	£112
Titanium CARES® Abutment	£138
Anatomic BL/Angled TL Abutment	£169
Gold Abutment £282 - Estimation of 3gms of gold @ £15 per gram	£282

Final conclusions

Today's best implants systems are reporting 98+% success rates, based on published research over 10 years. Component failure with these systems is very rare, however it is certain that using mismatched components will lead to a significant increase in the potential risk of failure and this is something I would not consider doing, even at the request of a clinician.

*Implants with original and non-original abutment connections Michel Gigandet, med. dent; Gianni Bigolin; Francisco Faoro; Walter Bürgin, biomed. eng; Urs Brägger, Prof. Dr. med. dent. Clin Implant Dent Relat Res. 2012 Jul 16, Epub ahead of print

"To claim your verifiable CPD you will need to answer these questions and submit them either by email to secretary@bidst.org or by post to the BIDST Membership Office 44-46 Wollaton Road, Beeston Nottingham NG9 2NR. You will also need to keep a copy of the article together with your feedback sheet and certificate for revalidation".

Q1.) In which study did the copycat abutments fracture during load tests?

a.) Seong Kyun Kim et. al. Inter. J of Maxillofacial Implants 2012:27:42:47

b.) Ho Lin et. al. Inter. J of Maxillofacial Implants 2012:27:42:49

c.) Shinying Choi et. al. Inter. J of Maxillofacial Implants 2012:27:42:50

Q2.) Which study cited that copycat abutments should not be considered?

a.) Michel LeGrande et.al. Clinical Implant Dentistry Relat.

b.) Michel Boschert et.al. Clinical Implant Dentistry Relat.

c.) Michel Gigande et.al. Clinical Implant Dentistry Relat.

Q3.) Which research discussed screw loosening of abutments?

a.) Tim et al. Int J Oral Maxillofac Implants 2012; 27:42–47

b.) Kim et al. Int J Oral Maxillofac Implants 2012; 27:42–47

c.) Dim et al. Int J Oral Maxillofac Implants 2012; 27:42–47

Q4.) If you use non-original system abutments, are manufacturer's warranties valid?

a.) Yes

b.) No

c.) Don't know

Q5.) If CADCAM is used to create an abutment, does this meet the manufacturer's specifications?

a.) All CADCAM milled abutments meet the manufacturer's specifications

b.) Only if milled by the original manufacturer's of the implant

c.) No CADCAM milled abutment meet the required standard

Q6.) Are you contravening the GDC 'Standards for the Dental Team' by using anything other than an original implant component?

a.) Yes

b.) No

c.) Don't know

Q7.) Which service offers the production of original CADCAM abutments without the need to purchase a CAD scanner?

a.) Scan Direct

b.) Straumann® Scan & Shape

c.) Scan and Go

Q8.) What is the cost difference between a Straumann® Variobase Stock Abutment with a metal coping and Gold abutment?

a.) £250

b.) £200

c.) £194

Q9.) Should a technician use a non-original component at the request of a clinician to save money?

a.) No

b.) Yes

c.) Not sure

Q10.) In the opinion of the author, do mismatched components potentially lead to implant failure?

a.) No
b.) Yes
c.) Not sure

British Institute of Dental & Surgical Technologists

Name:

GDC Number:

Address:

Postcode:

Telephone no: (in case of any queries)

Signed:

Date:

44-46 Wollaton Road,
Beeston,
Nottingham
NG9 2NR

Telephone: +44(0)115 968 3181
Fax: +44(0)115 925 4800
Website: www.bidst.org
Email: secretary@bidst.org

British Institute of Dental & Surgical Technologists