

**Dalbo®-System.**

On implants and roots.  
Robust and ingenious.

 **CENDRES<sup>+</sup>  
MÉTAUX**



## Dalbo®-System – From original to system

The ball anchor is the most widely used anchoring method worldwide. Cendres+Métaux SA is the leading supplier of prefabricated precision attachments for prosthetics. The original Cendres+Métaux Dalbo® ball anchor has been perfected and developed to become the ingenious Dalbo®-System.

This brochure provides an overview of the Dalbo®-System, its application and advantages.

More detailed information can be obtained from your local Cendres+Métaux representative or from Cendres+Métaux Switzerland.

## Dalbo® ball anchors on 2 implants

**Brief description of the case (Case 1, fig. 1–3)**

An implant-borne removable full denture is an alternative for treatment of the edentulous jaw. A group of scientific and clinical experts met at the McGill University (Montreal, Canada) to draw up a consensus report.

### Case 1: Dalbo®-PLUS



Fig. 1



Fig. 2



Fig. 3

**Fig. 1–3 Treatment carried out by:**  
 Christophe Rignon-Bret (DCD, MS, PhD, Associate Professor),  
 Jean-Marie Rignon-Bret (DCD, DSO, DEO, Professor, Head of  
 Prosthetic Department), René Descartes University, Paris 5, France.

The following fact was recorded in the report: a removable full denture supported on two implants is currently the preferred treatment option for the edentulous jaw. This treatment concept is not only reliable but also very cost-effective.

## Dalbo® ball anchors on 2 root caps

**Brief description of the case (Case 2, fig. 4)**

Two root caps with Dalbo® ball anchors represent a standard application and a simple method of retaining an overdenture.

## Dalbo®-Rotex®

**Brief description of the case (Case 3, fig. 5–6)**

Endodontic Dalbo®-Rotex® anchors for temporary retention of removable temporary dentures or as economy permanent attachments to retain simple overdentures.

### Case 2: Dalbo®-ball and socket unit (Fig. 4)



### Case 3: Dalbo®-Rotex®



Fig. 5



Fig. 6

**Fig. 4–6 Photographs provided by:**  
 Ch. E. Besimo, Prof. Dr med. dent.  
 Department of Dentistry, Aesculap Hospital, Brunnen, Switzerland

**Dalbo® ball anchor on 1 implant****Brief description of the case (Case 4, fig. 1–4)**

A 74-year-old female patient wanted the retention of her lower full denture improved. She had no problems with her full upper denture.

As the options were very restricted financially, only one implant was placed in the region of the symphysis. Financial restrictions also precluded the fabrication of a new denture. The lower denture as well as the intermaxillary relationship and occlusion of the dentures were also acceptable. After osseointegration, the implant was equipped with a prefabricated spherical anchor. The secondary unit was integrated into the existing lower denture under masticatory pressure.

This considerably improved the retention of the denture.

**Case 4: Dalbo® Ball Anchor on 1 implant**

Fig. 1



Fig. 2

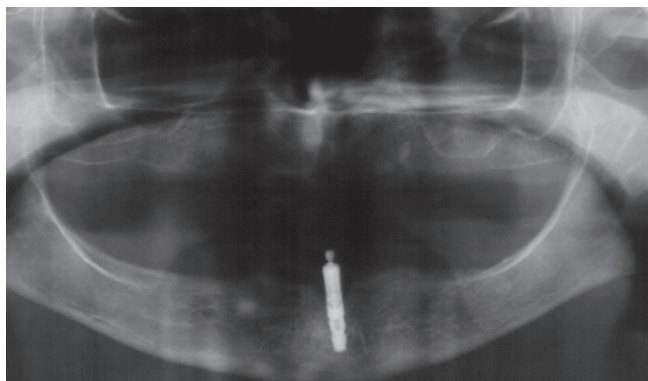


Fig. 3



Fig. 4

**Fig. 1–4 Treatment carried out by:**  
Prof. Dr. J. Setz, Department of Dental Prosthetics,  
Martin Luther University, Halle-Wittenberg, Germany

**Dalbo® ball anchor on 1 root cap****Brief description of the case (Case 5, fig. 5)**

A root cap with a Dalbo® ball anchor on a residual abutment tooth provided a simple option to improve the retention of the denture.

In this case the denture-related mucosal irritation visible in several areas illustrates a possible problem with this type of prosthetic restoration. Treatment options, such as a full denture, increasing the amount of abutments by placing an implant in the opposite canine region or a fully implant-borne denture, should therefore be taken into consideration depending on the anatomical and functional conditions as well as patient requirements.

**Case 5: Dalbo® Ball Anchor on 1 Root Cap**

Fig. 5

**Fig. 5 Photographs provided by:**  
Ch. E. Besimo, Prof. Dr med. dent.  
Department of Dentistry, Aesculap Hospital, Brunnen, Switzerland

## Implants with Dalbo® ball anchors replacing critical, missing abutment teeth

### Brief description of the concept (Case 6 + 7)

Since 1997 an increasing number of older patients with only a few residual teeth have been treated with implants. The primary function of these implants is as strategic abutments for stabilising a removable denture. This concept of implantological, prosthetic

treatment has been largely ignored till now: one-tooth restorations, free-end saddles and edentulous jaws have been the main focus of implant treatment.

As there is no standard classification for the residual dentition, the use of implants in these cases is illustrated with two examples.

### Case 6



Fig. 1



Fig. 2



Fig. 3

### Case 7



Fig. 1



Fig. 2



Fig. 3



Fig. 4

Treatment carried out by:  
 Prof. Dr Dipl.-Ing. E.-J. Richter, Head of Dental Prosthetics,  
 University Hospital, Würzburg, Germany

### Dalbo®-PLUS elliptic ball anchors on 4 implants, a removable bridge restoration

#### Brief description (Case 8, fig. 1–8)

A 62-year-old female patient came to us because she was dissatisfied with the retention and function of her upper full denture, as she still had a complete dental arch in the opposing jaw. The patient also complained of a gagging reflex due to the palatal coverage of the denture; though this was not serious, it could not be ignored.

Following implantation, osseointegration and exposure of four implants, a superstructure design was selected based on removable restorations on tapered crowns; the design was very similar to that of a fixed bridge restoration. As the design was very hygienic, the restoration only needed to be operator-removable.

#### Case 8



Fig. 1



Fig. 2



Fig. 3



Fig. 4



Fig. 5



Fig. 6



Fig. 7



Fig. 8

#### Treatment carried out by:

Prof. Dr Michael Heners (†), Berthold Steiner,  
Master Dental Technician  
Dental Training College, Karlsruhe, Germany

## Dalbo®-System – Advantages

What are the advantages of the Dalbo®-System compared with other types of anchors?

<p><b>1. Reliability and durability</b></p>	<p>The compact spherical shape is highly resistant. The special precious metal lamellar design ensures reliable, durable functioning. The functioning principle has been in use since the nineteen fifties and has proven its effectiveness in millions of cases. Patients questioned describe having a «feeling of security».</p>
<p><b>2. Simplicity</b></p>	<p>The Dalbo®-System is easy to use for the practice and laboratory and requires minimum servicing. The retention force is accurately set to suit each patient directly in the dental practice.</p>
<p><b>3. Universal use</b></p>	<p>The system components have been optimised for the relevant application. Minimum space is required when integrating them into the denture. There is now a spherical male part with a special base for laser welding.</p>
<p><b>4. Compatibility</b></p>	<p>All female parts of the Dalbo®-System fit the spherical male parts of other manufacturers and spherical ball attachments (Ø 2.25 mm) on implants<sup>1</sup>. We recommend the use of the special Dalbo®-PLUS and Dalbo®-PLUS elliptic female parts for the renewal of older restorations and with ball attachments from other manufacturers.</p>

<sup>1</sup> e.g. Straumann, Brånemark System®, OsseoTite NT®, SPI® System, Astra Tech Implants, Camlog® and other implant systems

### The Challenge: Durable function

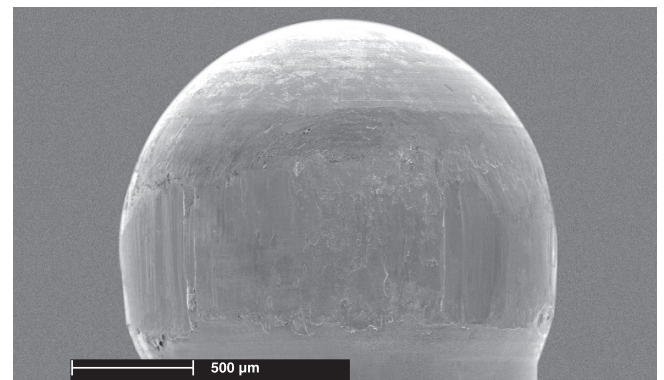
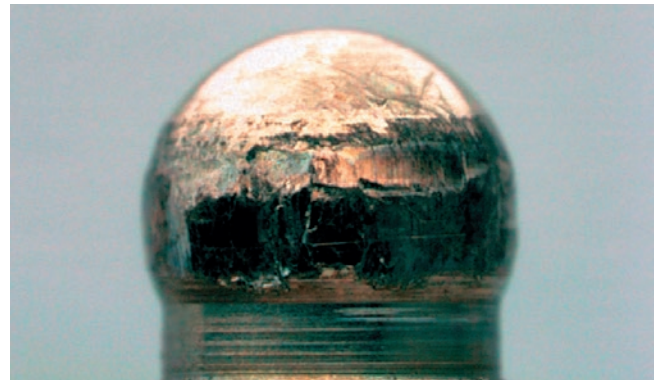
Spherical anchors allow movement of the denture on the denture-bearing tissue. According to various authors there can be more than 2 million masticatory movements per year.

Tests and clinical experience indicate that not all modern materials or anchor designs can withstand this enormous loading without damage. Female parts fabricated from plastic or those with plastic inserts sometimes exhibit extreme wear of the male part caused by substances that have become deposited in the plastic. Plaque tends to build up on plastic inserts and can be very abrasive.

A study by the University of Kiel, Germany, proved that female parts with an integrated, hard spring ring damage the male part equator to the extent that there is an irreparable, massive loss of denture retention. The majority of springs also fractured when loaded. Another of the latest generation of attachments with special plastic inserts initially exhibited very different and sometimes non-physiological withdrawal forces, which decreased considerably after 50,000 cycles<sup>2</sup>.



Damage caused by a plastic female part:  
Irreparable damage to the male part caused by a build-up of substances in the plastic



Damage caused by a female part with a spring unit:  
Considerable damage to the male part caused by the spring at the sphere equator

<sup>2</sup> Ludwig K.; Kern M.; Hartfil H.:  
Wear and tear of anchors with 50,000 fitting-withdrawal cycles in a water bath and eccentric end loading, 01.2004

**Solution:****The Dalbo®-System with precious metal lamellae**

The Dalbo®-System uses a principle, which in comparison with other systems reduces the effects of wear and tear to a minimum.

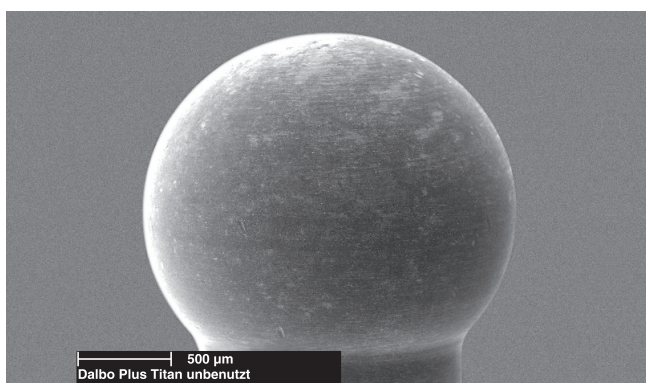
**Every female part has flexible precious metal lamellae.** These special lamellae prevent the build-up of abrasive plaque and tooth-paste. When fitting the denture, the flexible lamellae open and slide smoothly over the spherical male part without damaging it.

Decades of experience as well as extensive internal and external tests on the effects of wear and tear have shown that **there is for example virtually no wear after 50,000 fitting and withdrawal cycles<sup>2</sup>: 100 N were used as eccentric end loading to simulate loading during functional masticatory movements.**

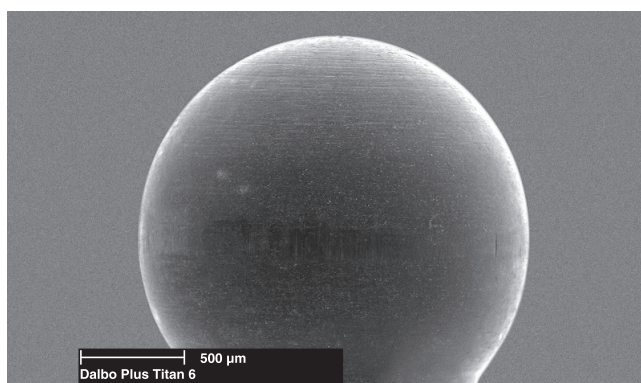
These results ensure **durable denture retention, minimum servicing and greater satisfaction for your patients.**

**Improve existing restorations with Dalbo®-PLUS female parts**

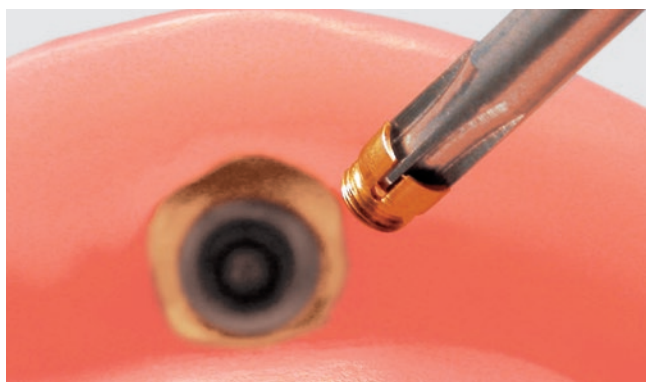
Older, existing restorations with worn spherical anchors from any manufacturer can be easily improved. **Dalbo®-PLUS female parts (incl. elliptic version) can be fitted with different lamellae inserts to spheres with extensive wear to restore the retention.** These components are inserted very easily and quickly. The screwdriver/activator is used for easy, durable fine adjustment of the denture retention.



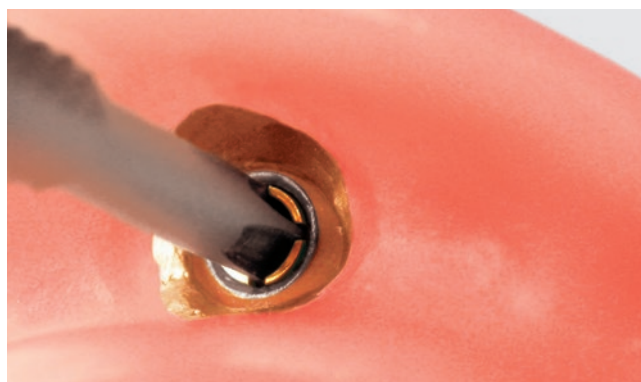
Straumann spherical titanium abutments before wear and tear



Straumann spherical titanium abutments after wear and tear



Easy replacement



Inserted – Activated – Ready

<sup>2</sup> Ludwig K.; Kern M.; Hartfil H.:

Wear and tear of anchors with 50,000 fitting-withdrawal cycles in a water bath and eccentric end loading, 01.2004

## The Dalbo®-System – Applications and Advantages of the Components

All the female parts shown here are based on the  $\varnothing$  2.25 male part. An overview of the different combinations as well as the catalogue number can be found on the next double page.

### Dalbo®-B



#### The original

The original shape of ball anchor since the nineteen fifties. Robust design, durable, tested and proven. Height of the female part 3.1 mm. Entirely made out of precious metal. The flexible lamellae, which can be activated, ensure durable denture retention.

**A spherical male part with a special base is available for laser welding. This component can also be soldered conventionally.**

### Dalbo®-PLUS und Dalbo®-PLUS elliptic



#### The high-end and comfortable model. Height of the female part 3.1 mm.

Titanium female part with threaded precious metal lamellae insert allowing the retention force to be finely, permanently and instantly adjusted with a screwdriver. Tuning female part with a reduced inner diameter for integration into an existing denture which can be used with worn spherical anchors of other manufacturers.

This enables the retention of existing dentures to be improved. **The elliptic version provides increased retention in the denture acrylic and is especially recommended for use with implants.**

### Dalbo®-Classic und Dalbo®-Classic elliptic



#### Cendres+Métaux ball anchor requiring the least space

The height of the female part is only 2.2 mm. One-piece precious metal female part.

The flexible lamellae, which can be activated, ensure durable denture retention.

**The elliptic version provides increased retention in the denture acrylic and is especially recommended for use with implants.**



### Dalbo®-PLUS Matritze und Dalbo® Abutment



### Ball abutments on implants

Dalbo® Abutment solutions are available for many implant systems like:

- Straumann®
- Astra Tech®
- Nobel Biocare®
- DENTSPLY Ankylos®
- Camlog®
- Osstem®

Details of the available systems, implant types and heights can be found in the instruction for use.

[www.cmsa.ch/docs](http://www.cmsa.ch/docs)

### Dalbo®-Rotex



### A ball anchor with self-tapping root thread to allow direct, immediate involvement of the roots in the retention of the denture.

This method eliminates casting a root cap and fitting a ball anchor. This reduces the cost and the patient benefits from a shorter treatment time. Indicated for roots with indeterminate prognosis, temporary restorations as well as for NHS dentistry and elderly patients. Plastic female parts (Cat. No. 051868) are suitable for short-term temporary restorations; metal female parts from the Dalbo®-System are recommended for long-term temporary restorations.

## Combination options with the Dalbo®-System

This table provides information about available male/female part combinations as complete units as well as recommended customised combinations.

- 7 Cendres+Métaux spherical male parts, all with a Ø 2.25 mm
- 6 female parts

Female parts		Male parts material	Dalbo®-Classic	Dalbo®-Classic elliptic	Dalbo®-B	Dalbo®-PLUS	Dalbo®-PLUS elliptic	Plastic Galak
			Cat. No. 055698	Cat. No. 055887	Cat. No. 051511	Cat. No. 055752	Cat. No. 055890	Cat. No. 051868
<b>Male parts</b>			 2,2 mm	 2,2 mm	 3,1 mm	 3,1 mm	 3,1 mm	 3,6 mm
Permanent restorations	All standard implant spherical anchors with Ø 2,5 mm	various	✓	✓	✓	✓	✓	
	Dalbo® Abutment	Syntax	✓	✓	✓	✓	✓	
	Yellow, for soldering Cat. No. 050423	Elitor®	✓	✓	Cat. No. 050427	✓	✓	
	Pd-free, white, cast-on Cat. No. 055647	Valor®	Cat. No. 055689	Cat. No. 055892	✓	Cat. No. 055750	Cat. No. 055889	
	Yellow, for soldering or laser welding Cat. No. 055921	Elitor®	✓	✓	✓	✓	✓	
	Cast-on Cat. No. 055330	Korak	Cat. No. 055701	Cat. No. 055893	Cat. No. 055331	✓	✓	
Temporary restorations	Dalbo®-Rotex «Bona», Size 1 Cat. No. 051869 Size 2 Cat. No. 051870	Pure titanium	✓	✓	✓	✓	✓	Cat. No. 051864 Cat. No. 051865
	Dalbo®-Rotex «Brunner», Size 1 Cat. No. 051871 Size 2 Cat. No. 051872	Pure titanium	✓	✓	✓	✓	✓	Cat. No. 051866 Cat. No. 051867

### Legend:

- Elitor®** = Protor® 3, yellow precious metal alloy
- Galak** = Orally stable plastic
- Korak** = non-residual burnout plastic
- Pure titanium** = Grade 4 pure titanium
- Valor®** = non-oxidising, Pd and Cu-free, cast-on precious alloy
- Syntax** = Titanium alloy, TiAl6 V4 ELI

- Order No.** = complete anchor (female and male parts)
- ✓ = only as single units (unlimited combination options)
- 
 = Ideal combination
- 
 = Recommended
- 
 = Recommended for temporary restorations
- 
 = Not recommended

## A

- **Assenza B., Occhiuzzi L., Caprotti A.:** Protesi rimovibili a estensione distale su impianti osteointegrati Analisi retrospettiva, *Italian Oral Surgery*, 2007; vol. 5, 3: 29-35

## B

- **Bayer S.:** Hybridprothetische Verankerungselemente im Verschleiss und der klinischen Anwendung. *Rheinländisches Zahnärzteblatt* (Jg. 48), Heft 4/April 2005
- **Bayer S., Bourauel C., Stark H., Utz K.-H.:** Implantatgetragene hybridprothetische Verankerungselemente im Verschleiss, Posterpräsentation anlässlich der DGZPW/SSRD Tagung in Basel (27.-29. April 2006)
- **Bayer S., Hültenschmidt R., Grüner M., Utz K.-H., Stark H., Bourauel C.:** Simulation und Analyse des Verschleisses von hybridprothetischen Verankerungselementen (Abstract zur Jahrestagung der DGZMK 2003), *DZZ Deutsche Zahnärztliche Zeitschrift* (11/2003)
- **Bayer S., Grüner M., Keilig L., Hültenschmidt R., Nicolay C., Bourauel C., Utz K.-H., Stark H.:** Investigation of the wear of prefabricated attachments - An in vitro study of retention forces and fitting tolerances. *Quintessence International* Volume 38, Number 5, May 2007
- **Bayer S., Grüner M., Keilig L., Hültenschmidt R., Bourauel C., Utz K.-H., Stark H., S. Mues:** Hybridprothetische Verankerungselemente - In-vitro Studie zur Trennkraftänderung und Resilienz, *DZZ Deutsche Zahnärztliche Zeitschrift*, 2008, (63/10)
- **Bayer S., Steinhäuser D., Grüner M., Keilig L., Enkling N., Stark H., Mues S.:** Comparative Study of four retentive anchor systems for implant supported overdentures - retention force changes, *Journal compilation 2009 The Gerodontology Association and Blackwell Munksgaard Ltd*
- **Besimo Ch.E.:** Prothetische Pfeiler nach Verlust der anatomischen Krone, *Quintessenz Zahnmedizin* 53, 7, 725–737 (2002)
- **Besimo Ch.E.:** Removable partial Dentures on Osseointegrated Implants. *Quintessence*, Chicago 1998
- **Besimo Ch.E., Guarneri A.:** In vitro retention force changes of prefabricated attachments for overdentures. *J Oral Rehabil* 30: 671–678, 2003
- **Besimo Ch.E., Wiehl P, Demartines B.:** Betagte zahnlose Patienten und implantatgetragener Zahnersatz. *Implantologie* 3: 199–208, 1996
- **Besimo Ch.E., Sigrist M., Jahn M.:** Vergleichende Untersuchung der Haltekraft endodontisch verankerter Kugelattachments bei Verschleissbeanspruchung in vitro. *Deutsche Zahnärztliche Zeitschrift* 59 (2004) 6, Seite 305 – 310
- **Boeckler A.F., Zschiegner F., Setz J.M.:** Implantatprothetische Verbindungselemente zur Verankerung von herausnehmbarem Zahnersatz - Eine Übersicht. *Implantologie* 2009;17(3):241-267
- **Burns D.R., Unger J.W., Elswick R.K., Beck D.R.:** Prospective clinical evaluation of mandibular implant overdentures: Part I – retention, stability and tissue response. *J Prosthet Dent* 73: 354–363, 1995
- **Burns D.R., Unger J.W., Elswick R.K., Giglio J.A.:** Prospective clinical evaluation of mandibular implant overdentures: Part II – patient satisfaction and preference. *J Prosthet Dent* 73: 364–69, 1995
- **Busch R., Kern M.:** Wiederherstellung der Retention bei dem schraubaktivierbaren Kugelkopfattachment Dalbo Plus. *Quintessenz ZM* 6/09
- **Büttel A. E.:** In vivo Verschleisserscheinung von Retentionselementen auf Implantaten: eine prospektive, klinische, kontrollierte 1-Jahresstudie. *Universität Basel*, Jan. 2009
- **Büttel A.-E., Bühler N.-M. Marinello C.-P.:** Locator oder Kugelanker ?, *SSO* 9/2009

## C

- **Cendres+Métaux:** De Dalla Bona au Dalbo-Plus, *Stratégie prothétique* NR 5/Novembre 2008
- **Cendres+Métaux:** Die Geschichte des Kugelankers nach Dr. Hans Dalla Bona (D/F/I), *Dental Dialog Swiss* edition 4/2007
- **Cendres+Métaux:** Het Dalbo kogelanker, een succesverhaal, *DENTAL UNION TOUCH* 1/2005
- **Cendres+Métaux France SAS:** Dalbo-Plus. Ancre supradiculaire rétentif à résilience, *L'information dentaire ADF*, novembre 2008 page 52
- **Colier P.:** Dalbo Plus System – szwajcarska precyzja. *Nowoczesny Techniki Dentystyczny* 4/2007
- **Cordioli G., Majzoub Z., Castagna S.:** Mandibular overdenture anchored to single implants: A five-year prospective study, *The Journal of Prosthetic Dentistry*, August 97, Seite 159–165

## D

- **Delcambre T., Picart B., Serhan I., Hardy V.:** Prothèse amovible partielle et attachments intra-axiaux Dalbo-Plus. *Stratégie prothétique* mai-juin 2010, Vol 10 No 3

## E

- **Eschmann Johannes:** SFI-Anchor - zwei starke Schweizer Unternehmen für Produktion und Vertrieb
- **EAO Poster:** Experimental study of the wear behaviour of retentive attachment systems for removable partial dentures on endosseous dental implants

## G

- **Germanier Ph., Bruna E., Palla S.:** Coiffes radiculaires en résine pour Perio-overdentures, *Rev Mens Odontostomatol*, Vol 116: 10/2006, Page 1011 – 1022
- **Germanier Ph., Bruna E., Palla S.:** Komposit-Wurzelkappen für Perio-overdentures, *Schweiz Monatsschr Zahnmed*, Vol 116 10/2006: Seiten 1023 – 1028

## H

- **Hsu Yung-tsung:** Use of light-polymerized composite resin to stabilize ball attachment during transfer procedures, *The Journal of prosthetic dentistry*, Volume 94 Number 5, page 470 – 471
- **Hsu Yung-tsung:** Retention Characteristics of Ball Attachments, *University of Alabama* 2009

## K

- **Kern M.:** 5-year randomized multicenter clinical trial on single dental implants placed in the midline of the edentulous mandible (*Clin Oral Impl Res.* 2021;32:212–221).
- **Kern M., Harder S., Wolfart S.:** Das mittige Einzel-Implantat im zahnlosen Unterkiefer älterer Patienten (besser eins als keins), *zm* 100, Nr. 18 A, 16.09.2010, (2404)
- **Kern M.:** Mittiges Einzel-Implantat im zahnlosen Unterkiefer – Ein Update, *Implantologie* 2012;20(1):23-30
- **M. Kern, W. Att, E. Fritzer, S. Kappel, R.G. Luthardt, T. Mundt, D.R. Reissmann, M. Rädcl, M. Stiesch, S. Wolfart, and N. Passia:** Survival and Complications of Single Dental Implants in the Edentulous Mandible Following Immediate or Delayed Loading: A Randomized Controlled Clinical Trial
- **Keweloh M., Mühlhäuser A.:** Deckprothese bei Alveolarkammatrophy, *dental-praxis*, XXIII, Heft 5/6-2006, Seite 153 – 165
- **Keweloh M., Mühlhäuser A.:** Overdentures for Atrophied Alveolar Ridges, *Spectrum Dialogue* Vol.8 No.5 May 09
- **Keweloh M., Mühlhäuser A.:** Prothèses amovibles dans les cas de crêtes alvéolaires atrophiées, *Spectrum Quebec* Vol.6 No.2 Été 2009
- **Kirsch A., Ackermann K.-L., Neuendorf G., Nagel R.:** Neue Wege in der Implantatprothetik. *Teamwork Interdisziplin J Proth Zahnheilkd*, 3. Jahrgang, 1/2000.
- **Kleis W.K., Kämmerer P.W., Hartmann S., Al-Nawas B., Wagner W.:** A Comparison of Three Different Attachment Systems for Mandibular Two-Implant Overdentures: One-Year Report, *Clinical Implant Dentistry and Related Research*, Volume 12, Issue 3, Pages 209-218, September 2010
- **Krennmaier G., Bukal J.:** Das symphyseale Einzelzahnimplantat zur Verankerung einer Unterkieferprothese beim betagten Patienten, *Stomatologie* Heft 6. Oktober 2000, Seite 155–159
- **Kuzmanovic D., Payne A., Purton D.:** Distal implant to modify the Kennedy classification of a removable partial denture: A clinical report. *THE JOURNAL OF PROSTHETIC DENTISTRY*, VOLUME 92 NUMBER 1 (page 8 – 11)

## L

- **Lecerf J.:** *Spectrum Québec*, Vol 5, No 3, Automne 2008
- **Liddelov G.J., Henry P.J.:** A prospective study of immediately loaded single implant-retained mandibular overdentures: Preliminary one year results, *The Journal of Prosthetic Dentistry*, Volume 97, June 2007 Issue 6, Page S126 – 137
- **Ludwig K., Hartfil H., Kern M.:** Untersuchung zum Verschleissverhalten von Kugelattachments, *Quintessenz Zahntech* 2005; 31, 10:1074-1083
- **Ludwig K., Hartfil H., Kern M.:** Analysis of the wear and tear of ball attachments, *Quintessence journal of dental technology*, Volume 4, Number 1, February 2006
- **Ludwig K., Hartfil H., Kern M.:** Analyse de l'usure et la rupture des attachments sphériques, *alternativeS N°30*, *Quintessenz International / Mai* 2006, p. 63 à 70
- **Ludwig K., Cretsi X., Kern M.:** In-Vitro-Untersuchung zu Abzugskräften von Kugelkopf-Attachments bei Implantatdivergenzen, *Abstract anlässlich der Jahrestagung der DGZPW 2005*, *DZZ Sonderheft A76*
- **Ludwig K., Cretsi X., Kern M.:** In-Vitro-Untersuchung zu Abzugskräften von Kugelkopf-Attachments bei Implantatdivergenzen, *DZZ* 61. Jahrgang, Heft 3 (2006) Seite 142 – 146

**M**

- **Marzola R., Scotti R., Fazi G., Schincaglia G.P.:** Immediate Loading of Two Implants Supporting a Ball Attachment-Retained Mandibular Overdenture: A Prospective Clinical Study. *Clinical Implant Dentistry and Related Research*, Volume 9, Number 3, 2007, Page 136 - 143
- **Mericske-Stern R.:** Die implantatgesicherte Totalprothese im zahnlosen Unterkiefer. *Schweiz Monatsschr Zahnmed* 98: 931–936, 1988
- **Mericske-Stern R., Geering A.H.:** Implantate in der Totalprothetik. *Schweiz Monatsschr Zahnmed* 98: 871–875, 1988
- **Mues S.:** Wiederherstellung von frakturierten Teleskoppeilern mittels Stiftaufbauten oder hybridprothetischer Verankerungselemente. *Quintessenz Zahnmedizin* 6/2008
- **Mues S., Bayer S., Mues A., Utz K.-U., Stark H.:** Prospektive Studie zur Wiederherstellung von abgebrochenen Teleskoppeilern mittels Stiftaufbauten oder Kugelankern, *Deutsche Zahnärztliche Zeitschrift* 61 (2006) 9, Seiten 484-488.
- **Mühlhauser A.:** Funktionelle Wiederherstellung einer Implantatprothese – Der Kugelkopfanter als bewährter Klassiker. *Das Internationale Zahntechnik Magazin* [www.ztm-aktuell.de](http://www.ztm-aktuell.de) 12/2011
- **Mühlhauser A., Keweloh M.:** Kugelkopfanter mit Dalbo-PLUS, Teil 1, dental-labor, LIV, Heft 11/2006, Seiten 1489 – 1504, Teil 2 Heft 12/2006, Seiten 1661 -1664
- **Mühlhauser A., Keweloh M.:** Rétenion boule avec les piliers Dalbo Plus, *Spectrum Québec – Digital Issue* 2013, Seiten 8-16
- **Müller F., Rentsch A.:** Deckprothesen, *Quintessenz ZM* 02/2009, Seiten 191-199
- **Müller F., Schimmel M.:** Implantatprothesen für den alten und sehr alten zahnlosen Patienten, *DZZ*, 6/2014.
- **Mundt T., Passia N., Att W., Heydecke G., Freitag-Wolf S., Luthardt R. G., Kappel S., Konstantinidis I.K., Stiesch M., Wolfart S., Kern M.:** Pain and discomfort following immediate and delayed loading by overdentures in the single mandibular implant study (SMIS), *Clin Oral Invest*, 2017

**N**

- **Naert I., Gizani S., Vuylsteke M., van Steenberghe D.:** A 5-year randomized clinical trial on the influence of splinted and unsplinted oral implants in the mandibular overdenture therapy. *Clin Oral Impl Res* 9: 170–177, 1998
- **Nothdurft F.P., Proson M., Spitzer W.J., Pospiech P.R.:** Implantatgetragene Versorgung eines ausgedehnten Resektionsdefektes der Maxilla, *SSO Vol.118* 9/2008, Seite 827 – 834
- **Nothdurft F.P., Proson M., Spitzer W.J., Pospiech P.R.:** Réhabilitation implantoportée d'une perte de substance importante suite à une résection partielle du maxillaire, *SSO Vol.118* 9/2008, Seite 835 – 842

**P**

- **Passia N., Abou-Ayash S., Bender D., Fritzer E., Graf M., Kappel S., Konstantinidis, I., Mundt T., Frfr. v. Maltzahn N., Wolfart S., Kern M.:** Single Mandibular Implant Study: Recruitment Considerations, *The International Journal of Prosthodontics*, Vol 30, Number 1, 2017
- **Passia N., Att W., Freitag-Wolf S., Heydecke G., Von Königsmark V., Freifrau von Maltzahn N., Mundt T., Räder M., Schwindling F.S., Wolfart S., Kern M.:** Single mandibular implant study – denture satisfaction in the elderly, *Journal of Oral Rehabilitation*, 2017 44: Seiten 213–219
- **Nicole Passia, Samir Abou-Ayashb, Daniel R. Reissmann, Elfriede Fritzer, Stefanie Kappele, Ioannis Konstantinidis, Valerie v. Königsmarckg, Torsten Mundth, Meike Stieschi, Stefan Wolfartj, Shurouk Alia, Matthias Kern:** Single mandibular implant study (SMIS) – masticatory performance – results from a randomized clinical trial using two different loading protocols

**R**

- **Richter E.-J.:** Implantate als zusätzliche strategische Pfeiler bei herausnehmbarem Zahnersatz – Ein Therapiekonzept, *Implantologie* 2003; 11/1: 39–60
- **Richter E.-J.:** Wann ist der richtige Zeitpunkt für Implantate, *DZW-Spezial* 4/04 (Seite 8-11) & *zm (Zahnmedizin)* 94, Nr. 12, 16.6.2004 (Seite 1554 – 1556)

**Cendres + Métaux SA**

Rue de Boujean 122  
 CH-2501 Biel/Bienne  
 Phone +41 58 360 20 00  
 Fax +41 58 360 20 10  
[www.cmsa.ch](http://www.cmsa.ch)

- **Richter E.-J.:** Implants with Dalbo® stud anchors as replacements for critical, missing abutment teeth. *Spectrum* May/June 2005
- **Rignon-Bret C., Herbout B., Wulfman C.:** **Implant Overdenture, using ball attachment:** A preliminary report of a clinical trial
- **Rignon-Bret C., Descamp F., Cheron R., Chalach N.:** Solidarisation directe de l'attachement Dalbo®-PLUS: Quelle résine choisir? *Poster* Mai 2004
- **Rignon-Bret C., Wermuth W.:** Caractéristiques Techniques des principaux systèmes d'attachements en PACSI (Realites Cliniques Vol. 14 n° 2 2003 pp. 236–237)
- **Rignon-Bret C., Rignon-Bret J.-M.:** Implantat retained removable full lower denture / Prothèse amovible complet supra-implantaire mandibulaire, *SPECTRUM IDS* 2005, Page 70 – 72
- **Rignon-Bret C., Herbout B., Chéron R., Audoux C.:** Solidarisation direct des attachements en prothèse amovible: quelle résine choisir?, *Stratégie prothétique* février 2006, vol 6, n° 1
- **Rignon-Bret C., Wulfmann C., Bissery A., Hadida F., Renouard F.:** Immediate loading of implants with mandibular overdentures using ball attachments: One-year results of a prospective study. *Poster* 2007

**S**

- **Setz J., Hyung L.S., Engel E.:** Retention of prefabricated attachment for implant stabilized overdentures in the edentulous mandible: An in vitro study, *The Journal of Prosthetic Dentistry*, September 98, Seite 323–329
- **Steiner B.:** Karlsruhe Konstruktion – Abnehmbare Brücke auf Implantaten, dental-labor, Lill, Heft 1/2005

**T**

- **Teubner E.:** Verankerungen von abnehmbaren Prothesen von A (Adhäsiv-Attachment) bis Z (Zest Anker), *SSO*, Vol. 119, 1/2009

**V**

- **Veasco B., Gonzalez G., Quevedo M., Fernandez M., Beica A.:** Influencia del paralelismo de los implantes en la retencion de los ataches de sobredentaduras implantosoportadas, *RCOE* 2008 Vol. 13

**W**

- **Walton Joanne N., Glick Ned, MacEntee Michael I.:** A Randomized Clinical Trial Comparing Patient Satisfaction and Prosthetic Outcomes with Mandibular Overdentures Retained by One or Two Implants, *University of British Columbia, Canada*, Volume 22 Number 4, 2009
- **Welz T.:** Innovative Kugelattachments als Bereicherung des Behandlungskonzeptes in der Implantologie 6/99 Seite 20–21
- **Welz T.:** Neue Druckknopf-Varianten für enge Platzverhältnisse und die Implantologie, *DZW-ZahnTechnik* 4/99 Seite 32
- **Werner E.:** Hybridprothese mit elliptischer Matrize, *dental dialogue* 3/2006, Seite 84 -91
- **Wiemeyer A.S., Agar J.R., Kazemi R.B.:** Orientation of retentive matrices on spherical attachments independent of implant parallelism, *The Journal of Prosthetic Dentistry*, Volume 86, Number 4, Seite 434-437
- **Wolf K., Ludwig K., Hartfil H., Kern M.:** Analysis of retention and wear of ball attachments, *Quintessenz International* May 2009
- **Wolfart S., Brunzel S., Braasch K., Kern M.:** Das mittige Einzelimplantat im zahnlosen Unterkiefer. *Implantologie* 15; 2007, seite 195-204
- **Wolfart S., Brunzel S., Kern M.:** Strategische Pfeilervermehrung mit Implantaten unter vorhandenen Doppelkronenprothesen. *Quintessenz Zahnmedizin* 9/2009
- **Wulfmann C., Bissery A., Renouard F.; Herbout B., Postaire M., Rignon-Bret C.:** Evaluation of patient satisfaction in a prospective clinical trial with an immediate-loading protocol of a mandibular overdenture. *Poster* 2007

**Z**

- **Zitzmann N.U., Rohner U., Weiger R., Krastl G.:** Kriterien zur Auswahl der Retentionselemente für herausnehmbaren Zahnersatz. *Quintessenz Zahntech* 2010;36(2):000-000
- **zt-aktuell:** **Supraradikuläre, retentive Resilienzverankerung:** Nr. 11 / November 2006, Seite 18