

IMPLANT TRIBUNE

The World's Dental Implant Newspaper · U.S. Edition

NOVEMBER 2008

www.implant-tribune.com

VOL. 3, No. 11

Inside this issue

**SimPlant Conference
in Monterey**



The 2009 SimPlant Academy World Conference is planned for Monterey, Calif., next June. The event will focus on 3-D digital dentistry.

Page 4

Powerful investment



Dr. Domenick DeFrancis explains why the cone beam CT scanner from PreXion is the best purchase and investment he's made since the inception of his dental practice.

Page 14

Live from San Diego, it's AAID!

Surgeries broadcast live are the highlight of this year's annual meeting

By Sierra Rendon, Managing Editor

"I thought there was no way they were going to be able to pull it off..."
"I think they should do it every year."

"I was really amazed at how well prepared they were — they came right in and the patients were ready to go."

These were just a few of the glowing comments heard immediately following the first two live surgeries that took place the morning of Oct. 31 at the American Academy of Implant Dentistry's 57th Annual Meeting at the Manchester Grand



Two live surgeries are shown side-by-side at the AAID's annual meeting in San Diego on Oct. 31.

→ **II** page 16

The 'All-on-4' implant concept for edentulous jaws

By Paulo Maló, DDS, and Miguel de Araújo Nobre, RDH

The efficacy of dental implant treatment is well-documented and its further development includes protocols for simplifying the procedures.

The immediate function protocol is a powerful simplification as it allows the complete rehabilitation to be finalized within the same procedure.¹⁻²⁹ The fact that four implants is an optimal number for complete-

arch prosthesis is an important further simplification. Provided the implants are placed as "cornerstones" — two posteriorly and two anteriorly^{30,31} — and they are well-anchored, the probability for success is high.^{32,33} It has also been demonstrated that tilting of implants might be advantageous as longer implants may be placed with good cortical anchorage in optimal positions for prosthetic support and reducing the length of the cantilever.³⁴⁻³⁶

Based on these principles the All-on-4 concept was developed for safe and simple treatment of totally edentulous mandibles and maxillas and has been shown to be a viable option. The advantage of the All-on-4 for the edentulous mandible is it avoids the use of bone graft or nerve transposition techniques even in



Fig. 1: All-on-4 Maxilla high resorption, implant position.

severely resorbed situations. In the edentulous maxilla, where insufficient residual bone volume often makes implant placement posterior to the canine/first premolar impossible, the All-on-4 concept offers solutions in situations where other-

→ **II** page 6

AD

Experience
EXCELLENCE
IN COSMETIC DENTISTRY 2009
www.aacd.com • 800.543.9220
25th ANNIVERSARY AAID SCIENTIFIC SESSION
Monday, April 27 - Friday, May 1, 2009 • HONOLULU, HAWAII
AMERICAN ACADEMY
OF COSMETIC DENTISTRY
CELEBRATING 25 YEARS OF EXCELLENCE

PRSRT STD
U.S. Postage
PAID
Permit # 306
Mechanicsburg, PA

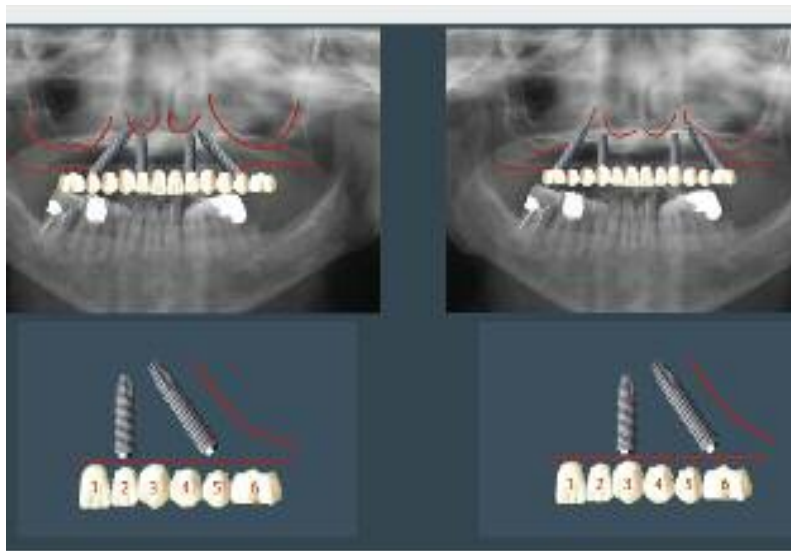


Fig. 2: All-on-4 Maxilla moderate resorption, implant position.

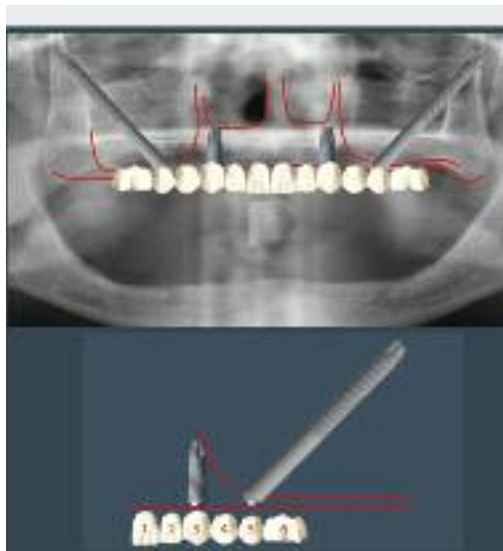


Fig. 3: All-on-4 Hybrid, implant position.

← **II** page 1

wise bone grafting would have been indicated.

This paper aims to explain the indications for the All-on-4 system treatment, which maneuvers around the anatomical limits and risks and allows in a small amount of time to accurately perform implant treatments for fully edentulous jaws

Materials and methods

The All-on-4 concept is based on the optimal number of four implants for supporting an edentulous jaw with a complete arch prosthesis. The concept benefits from posterior tilting of the two distal implants, which offers a minimum of 10 teeth in the immediately placed prosthesis with a maximum of a one-tooth distal cantilever. The procedures are described elsewhere^{32,33} and here we offer a summary of the protocol.

• *Inclusion/exclusion criteria*

The patients undergo medical history, clinical observation and complementary radiographic exams of panoramic X-ray (bone height) and a CT-scan (bone quality and bone volume). For the mandible, the anatomical inclusion criterion is a bone ridge of a minimum 4 mm width and maximum 8 mm height in the interforamina area.

For the edentulous maxilla, the height and width of the residual crest bone available between the anterior walls of the maxillary sinus for the maxilla and between the mental foramina for the mandible will establish the type of All-on-4 surgical approach: All-on-4 Standard, All-on-4 Hybrid or All-on-4 Extra-Maxilla.

For the All-on-4 Standard, the anatomical inclusion criterion is a bone ridge of a minimum 4 mm width and maximum 10 mm height from canine to canine. The All-on-4 concept can be used at different degrees of maxillary atrophy as the position of the posterior implant is the determining factor for the interimplant distance.

Depending on the degree of resorption, the posterior implant head will emerge at different positions at the bone crest, normally between the first premolar [high resorption (Fig. 1)] and the first molar [moderate resorption (Fig. 2)]. If the above criteria are not met, then an All-on-4 Hybrid or All-on-4 Extra-Maxilla should be considered. In the All-on-4 Hybrid rehabilitation, maxillary anchored implants are used in conjunction with extra-maxillary anchorage implants (anchored in the zygomatic bone) (Fig. 3), whereas in All-on-4 Extra-Maxilla, only four extra-maxillary anchorage implants are used (Fig. 4).

Surgical protocol

AD

Always in control

SimPlant® CompatAbility

Imagine a set of tools that gives you the confidence to perform every step of implant treatment with pinpoint predictability and accuracy. Now imagine all of this at the time of surgery. You've embraced SimPlant® CompatAbility, a cost-effective, highly profitable and user-friendly system that gives you the freedom to work with any implant brand available on the market today. For more information on the latest version of SimPlant visit www.materialisedental.com.

Come see us at:
AAOMS Chicago Booth #427

SimPlant® SurgiGuide® Immediate Smile®

Materialise Dental

www.materialisedental.com

→ **II** page 8



Fig. 4: All-on-4 Extra-Maxilla, implant position.



Fig. 5: Edentulous guide in place.



Fig. 6: Implant neck positioned at bone level with the desired distal angulation helped by the edentulous guide.



Fig. 7: Thirty-degree angulated abutment placed to compensate the distal implant tilting in the mandible.

← **II** page 6

• **Medication**

The surgical procedures for both jaws were performed under local anesthesia with mepivacaine chlorhydrate with epinephrine 1:100,000 (Scandinibsa 2 percent®, Inibsa Laboratory, Barcelona, Spain). All patients were sedated with diazepam (Valium® 10 mg, Roche, Amadora, Portugal) prior to surgery. Antibiotics (amoxicillin 875 mg and clavulanic acid 125 mg, Labesfal, Campo de Besteiros, Portugal) were given one hour prior to surgery and daily for six days thereafter.

Cortisone medication (prednisone [Meticorten® Schering-Plough Farma, Lda, Agualva-Cacém, Portugal], 5 mg,) was given daily in a

regression mode (15 mg to 5 mg) from the day of surgery until four days postoperatively. Antiinflammatory medication (ibuprofen, 600 mg, Ratiopharm, Lda, Carnaxide, Portugal) was administered for four days postoperatively starting on day four. Analgesics (clonixine [Clonix®, Janssen-Cilag Farmaceutica, Lda, Barcarena, Portugal], 300 mg,) were given on the day of surgery and postoperatively for the first three days if needed. Antacid medication (omeprazole, 20 mg, Lisboa, Portugal) was given on the day of surgery and daily for six days postoperatively.

• **Flap procedure**

The implants and abutments are placed in one position at a time, starting with the two posterior locations. The implant placement is assisted by a special guide, designed by the author (P.M.) (Fig. 5). The guide is placed into a 2 mm hole made at the midline of the jaw and the titanium band is bent so the occusal centerline of the opposing jaw was followed. By this, it is possible to guide the implants to be placed in the center of the opposing prosthesis and at the same time to find the optimal position and inclination for best implant anchorage and prosthetic support.

The insertion of the implants (Brånemark System®; Nobel Speedy®, Nobel Biocare AB; Gothenburg, Sweden) follows standard procedures, except that under-preparation is used when needed to get a final torque of more than 40 Ncm before the final seating of the implant. Countersinking is used only when needed to create space for the head of the tilted implants and/or to secure both buccal and lingual cortical bone contact at the implant head in thin bone crests. The preparation is typically done by full drill depth with a 2 mm or a 2.5 mm twist drill (depending on bone density), followed by a widening of the entrance in the cortical bone with a 5 mm twist drill and an adjustment with the countersink, if needed.

The implant neck is positioned at bone level, and bicortical anchorage is established whenever possible (Fig. 6). The length of the implants varies from 10 mm to 18 mm. In case of immediate extraction, the sockets are made free from soft tissue remnants and cleaned to avoid infection. In case of periodontitis on the lower incisors, extraction, curettage and bone shaping is performed and virtually no socket is left. After closing and suturing the flap with 4-0 non-resorbable suture, the access to the abutments is opened by a punch and impression copings are placed.

Implant placement in the mandible: In the mandible, a mucoperiosteal flap is raised along the top of the ridge in the intermentonian area. The two most anterior implants follow the jaw anatomy in direction, which in severe resorption cases means a posterior tilting. Two

AD

GOLDEN MISCH
physics
 forceps
 simple • predictable • more efficient

DENTISTRY TODAY TOP 100 PRODUCTS 2007
DENTISTRY TODAY TOP 100 PRODUCTS 2008

Take advantage of our **90 day** trial period

Visit us at the **Greater New York Dental Meeting Booth # 3431** for a **Free DVD** and convention special offers.

*ORDERS NOW BEING ACCEPTED FOR OUR NEW 3rd MOLAR INSTRUMENTS.

learn more about the physics forceps at
GOLDENMISCH.COM
 1 877 987 2284

ADVANCEMENTS IN DENTISTRY
Supporting Comments for the New Extraction Forceps



Anthony S. Feck, DMD

I have never looked forward to doing extractions in my practice. It can take just a few minutes or more than half an hour if I hear that dreaded 'cracking' sound indicating I have broken a crown or a root. Since using the Physics Forceps that sound is a thing of the past. These new forceps don't rely on brute force, but rather, use the simple concept of leverage. Instead of grasping, pushing, twisting and pulling the clinical crown, this technique employs a slow, steady rotational force that literally rolls the tooth free from the PDL. Seldom do new innovations come along that truly revolutionize the way a dentist approaches a service – this is one!



Louis Malcmacher, DDS, MAGD

Faster, easier and better - these are the three magic attributes that I look for whenever I evaluate new products. The GoldenMisch Physics Forceps are by far one of the greatest advancements I have seen in exodontia in my 28 year career. Using these unique instruments greatly reduces buccal bone loss during the extraction, making implant support and esthetic success much more predictable. The amount of time, effort and frustration saved is incredible, especially with challenging teeth. The Physics Forceps are an absolute must for every dental practice and I highly recommend them in my lectures.

→ **II** page 10



Fig. 8: Inserting the anterior implant. The orientation is helped by the guide pin.



Fig. 9: Postoperative intra-oral photograph with immediate provisional prosthesis in place.



Fig. 10: Digital planning for Nobelguide — All-on-4 flapless approach.



Fig. 11: Surgical template in place for flapless surgical technique.



Fig. 12: Postoperative orthopantomography of an All-on-4 Hybrid rehabilitated patient with the immediate provisional prosthesis in place.



Fig. 13: Postoperative intra-oral photograph of an All-on-4 Hybrid rehabilitated patient with the immediate provisional prosthesis in place.

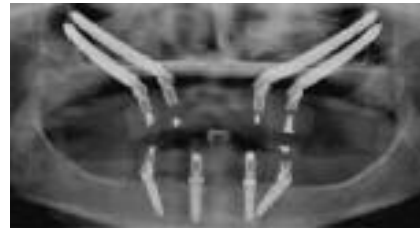


Fig. 14: Postoperative orthopantomography of an All-on-4 Extra-Maxilla rehabilitated patient with the immediate provisional prosthesis in place.



Fig. 15: Postoperative intra-oral photograph of an All-on-4 Extra-Maxilla rehabilitated patient with the immediate provisional prosthesis in place.

← IT page 8

additional implants are inserted just anterior to the foramina and tilted distally about 30 degrees relative to the occlusal plane. This arrangement allows for good implant anchorage, short cantilever length and large inter-implant distance. The posterior implants typically emerge at the second premolar position.

The posterior implants are of 4 mm diameter, while the anterior ones are either 4 or 3.75 mm in diameter. Angulated abutments (Brånemark System®, Nobel Biocare AB, Gothenburg, Sweden) are used. The angle is either 17 degrees or 30 degrees at the anterior implants and always 30 degrees at the posterior implants (Fig. 7). These abutment angulations were chosen such that the prosthetic set screw access holes were in an occlusal or lingual location.

Implant placement in the maxilla: In the maxilla, the posterior implant tilting allows a position shift on the implant head from a vertically placed implant in the canine/first pre-molar region to a tilted implant in the second pre-molar/first molar region, following the anterior sinus wall with about 45 degrees of inclination.

Thirty-degree angulated abutments are placed on the implant correcting the inclination to a maximum of 15 degrees. The posterior implants are 4 mm in diameter

The anterior implants are oriented vertically by a guide pin replacing the special surgical guide (Fig. 8). Care has to be taken in the selection of the anterior positions not to come in conflict with the apex of the tilted posterior implants, which normally reach the canine area. The anterior implants are either 4 or 3.75 mm in diameter and typically placed in lateral or central incisor positions. This implant arrangement allows for good implant anchorage, a large inter-implant distance and short cantilever length with the posterior implants typically

Table I – Cumulative Survival Rate for the All-on-4 standard in the mandible

Duration	Number of Implants				CSR%
	Total	Failed	Withdrawn	Not yet due	
Placement-6 mths	2164	16	8	104	99,26
6 mths - 1 yr	2036	1	0	405	99,17
1 - 2 yrs	1630	5	3	386	98,65
2 - 3yrs	1236	0	8	302	98,65
3 - 4 yrs	906	1	0	275	97,46
4 - 5 yrs	630	1	0	445	96,19
5 - 6 yrs	184	0	0	83	96,19
6 - 7 yrs	101	0	0	47	96,19
7 - 8yrs	54	0	0	46	96,19
8 - 9 yrs	6	0	0	8	96,19

Table II- Cumulative Survival Rate for the All-on-4 standard in the Maxilla

Duration	Number of Implants				CSR%
	Total	Failed	Withdrawn	Not yet due	
Placement-6 mths	1596	18	12	108	98,87
6 mths - 1 yr	1458	4	0	434	98,49
1 yr - 2 yrs	1020	2	4	445	97,65
2 yrs - 3yrs	569	0	0	399	97,65
3 yrs - 4yrs	170	0	0	146	97,65
4 yrs - 5yrs	24	0	0	24	97,65

Table III- Cumulative Survival Rate of the Extra-Maxillary Implants

Time Period	In Function	Failed	Withdrawn	Survival Rate	CSR %
Loading - 6 Mo	68	0	2	100%	100%
6 Mo - 1 Yr	66	1	0	98,5%	98,5%
1 Yr - 2 Yrs	37	0	0	100,0%	98,5%

CSR= Cumulative Survival Rate

emerging at the second premolar/first molar position.

• **Immediate prosthetic protocol**
Provisional complete-arch all-acrylic prostheses are delivered on the day of surgery. A pre-made impression tray is used. Small volumes of silicon are placed around the copings, followed by complete filling with soft putty. After removal of the copings, protection caps are placed to support the periimplant mucosa during the manufacturing of the prosthesis. Based on the impression, a high-density baked all-acrylic

prosthesis with titanium cylinders is manufactured at the laboratory and most often delivered to the patient within two to three hours (Fig. 9). The provisional prosthesis should not have more than one cantilever tooth and consequently the number of immediate teeth varies from 10 and up, depending on the degree of resorption. (The final prosthesis may have two cantilever teeth, though).

• **Flapless procedure**
The positions of the implants are the same as for the flap procedure,

but the planning is made in a computer on a 3-D model of the patient's jaw. At surgery the implants are oriented by a precision guide (Nobel-Guide, Nobel Biocare, Gothenburg, Sweden) based on the planning data,²⁷ and a pre-surgery manufactured prosthesis is immediately delivered after surgery (Figs. 10,11).

• **All-on-4 Hybrid/ All-on-4 Extra-Maxilla**

An alternative solution for oral rehabilitation in the atrophied maxilla is the use of implants placed in the zygomatic bone, alone or in conjunction with regular implants.³⁷⁻³⁹ However, the placement of zygomatic anchored implants through the standard technique often causes the implant heads to emerge too palatal for an optimal prosthetic solution (especially in cases of extreme atrophy), as the bone ridge retracts palatally when it atrophies.⁴⁰

The extra-maxillary anchorage technique aims to eliminate these difficulties by placing long implants external to the sinus, anchored in only the zygomatic bone and covered by soft tissue after emerging from the bone.

By doing so, the implant head will be positioned in a prosthetically correct position. The implants emerge in the positions between the lateral incisor and the first molar, on the crest at the ideal prosthetic position, while the foreseen prosthetic screw exits localize on the occlusal surfaces of the prosthetic teeth or on the internal wall of the bridge through the false gingiva.

As in the standard All-on-4 technique, complete-arch all-acrylic prostheses are delivered on the day of surgery.

Two clinical situations representing two patients eligible for a complete edentulous maxillary rehabilitation through the All-on-4 Hybrid and All-on-4 Extra-Maxilla solution are presented (Figs. 12-15). The extra-maxilla technique complements the All-on-4 concept by replacing one to four standard implants with an extra long implant placed in the zygomatic bone only, making it fit to rehabilitate any degree of maxillary bone atrophy.



Fig. 16: Final prosthesis with a titanium CAD/CAM infrastructure and ceramic teeth.

• **Maintenance protocol**

The patients are instructed to have a soft food diet for two months. Ten days after surgery, the sutures are removed (if used), and hygiene and implant stability are checked. The procedure is repeated two and four months after surgery is performed until stability is achieved.

• **Final prosthetic protocol**

Final prostheses are delivered at six months (Fig. 16). If an adjustment of the angulated abutment was needed for better positioning of the screw access hole, the impression for the final prosthesis is taken at implant level. The abutment position is then decided at the laboratory and is adjusted in the patient's mouth.

• **Implant survival criteria**

Survival was based on function, individual implant stability (checked manually), absence of pain and infection, and radiographic analysis at time of evaluation.

• **Marginal bone level**

The marginal bone level relative to the implant platform was read from periapical radiographs taken at the time of last follow-up within the study frame and at the additional follow-up for the present study. A conventional radiograph holder was used, and its position was manually adjusted for an estimated orthognathic position of the film. For a few patients, panoramic radiographs were used due to access problems.

Results

• **Implant survival**

The implant survival rates are

presented in life tables. Tables I and II show the results for the All-on-4 standard, for the rehabilitation in the mandible and maxilla, respectively. The data concerns the routine groups as presented in the previous clinical studies^{32,33} plus the result from the subsequent follow-up until today.

These results show the incidence of implant losses for both the maxilla and mandible rehabilitations are low and decrease dramatically after the first six months of function, rendering high survival rates.

The preliminary results for the cumulative survival rate of the extra-maxillary anchorage implants are shown in Table III. The results indicate high survival rates with a follow-up of up to two years for the All-on-4 Hybrid and All-on-4 Extra-Maxilla implants.

• **Marginal bone level**

The average bone levels relative to the implant platforms at one year of follow-up were 0.9 mm (SD 1.0 mm) for the maxilla and 0.7 mm (SD 0.5 mm) for the mandible. The average bone levels for the mandible at five years of follow-up were 1.7 mm (SD 1 mm).

Discussion

These results and the outcome from the present study indicate that immediate function for the maxilla and mandible can be highly predictable treatments (high survival rates and low marginal bone resorption), provided an optimal placement of the implants. The All-on-4

concept with implant tilting utilizes the load carrying capacity of the bone in an optimal way; the implants are spread anteriorly-posteriorly, giving an optimal prosthetic base and are well anchored in dense bone structures (anterior bone with higher density) due to the freedom of tilting.

By reducing the number of implants to four, each implant can be optimally placed without any compromise to adjacent implants. The data supports that this biomechanical optimization of the implant positions is clinically effective. The fact that the prostheses survival could be kept at 100 percent, even with less than four implants supporting the prosthesis, also demonstrates the efficacy of the implant positions.

Moreover, using finite element analysis, it is possible to conclude that there is a biomechanical advantage in using splinted, tilted distal implants rather than axial implants supporting distal cantilever units when comparing the coronal stress.⁴¹

The use of only four implants simplifies many aspects of the treatment: a more aesthetic prosthesis can be manufactured, it simplifies the manufacture of the prosthesis, it reduces the risk for prosthetic complications, and it simplifies the patient's dental hygiene procedure.

Conclusions

In conclusion, the All-on-4 immediate function concept for completely edentulous jaws has proven to be clinically effective, patient pleasing and applicable in many situations where otherwise more complicated procedures would have been indicated.

It is a standardized treatment procedure than can be routinely applied to most edentulous patients with a short treatment procedure and prostheses in place and functional a few hours after the start of surgery.

It's well adapted to further simplifications such as flapless surgery based on computer planning and can be recommended as a method

About the author



Paulo Malo, president and CEO of the MALO CLINIC Health Group, graduated in 1989 from the Faculty of Dental Medicine, University of Lisbon, and founded MALO CLINIC in 1995. The large success and exponential growth of his clinic has prompted an extensive international expansion and the birth of an International Health Group, present in five continents. He is a co-author of several books and has published several scientific articles, as well as been a frequent guest speaker in numerous international conferences on health-related issues or management. Aside from his clinical practice and corporate management, he is a visiting professor in several prestigious universities, as well as a leading consultant in four major dental medicine international companies. Throughout his career he has also received several distinctions and awards, either for his medical breakthroughs, or for his managing, leadership and entrepreneurial skills.

of choice for rehabilitation of completely edentulous jaws.

References are available upon request from s.rendon@dtamerica.com.

AD



Come Aboard and Experience In-Depth Implant Education

Boston Convention & Exhibition Center
January 28 - February 1, 2009 * Exhibits January 29-31, 2009



Chart a New Course for Learning and Discovery in Dentistry

- ★ Earn CEUs from Top Clinicians
- Learn new paradigms in implant dentistry
- Master state-of-the-art techniques

- ★ Engage with 29,000+ Dental Professionals
- ★ Explore 500+ Educational Exhibits

Predictable Implant Prosthesis • Saturday, January 31, 2009



Joseph Carpentieri, DDS

- ★ Learn to differentiate between treatment of mandibular and maxillary arches.
- ★ Discuss advantages and disadvantages to both fixed and removable prostheses

- ★ Review a series of new surgical and restorative guidelines
- ★ Apply principles to a greater number of patients resulting in consistent, high-level patient satisfaction

Thanks to 3i Implants Innovations, Inc. for its support.

Register Now!

www.yankeedental.com

800-342-8747 (MA)

800-943-9200 (Outside MA)