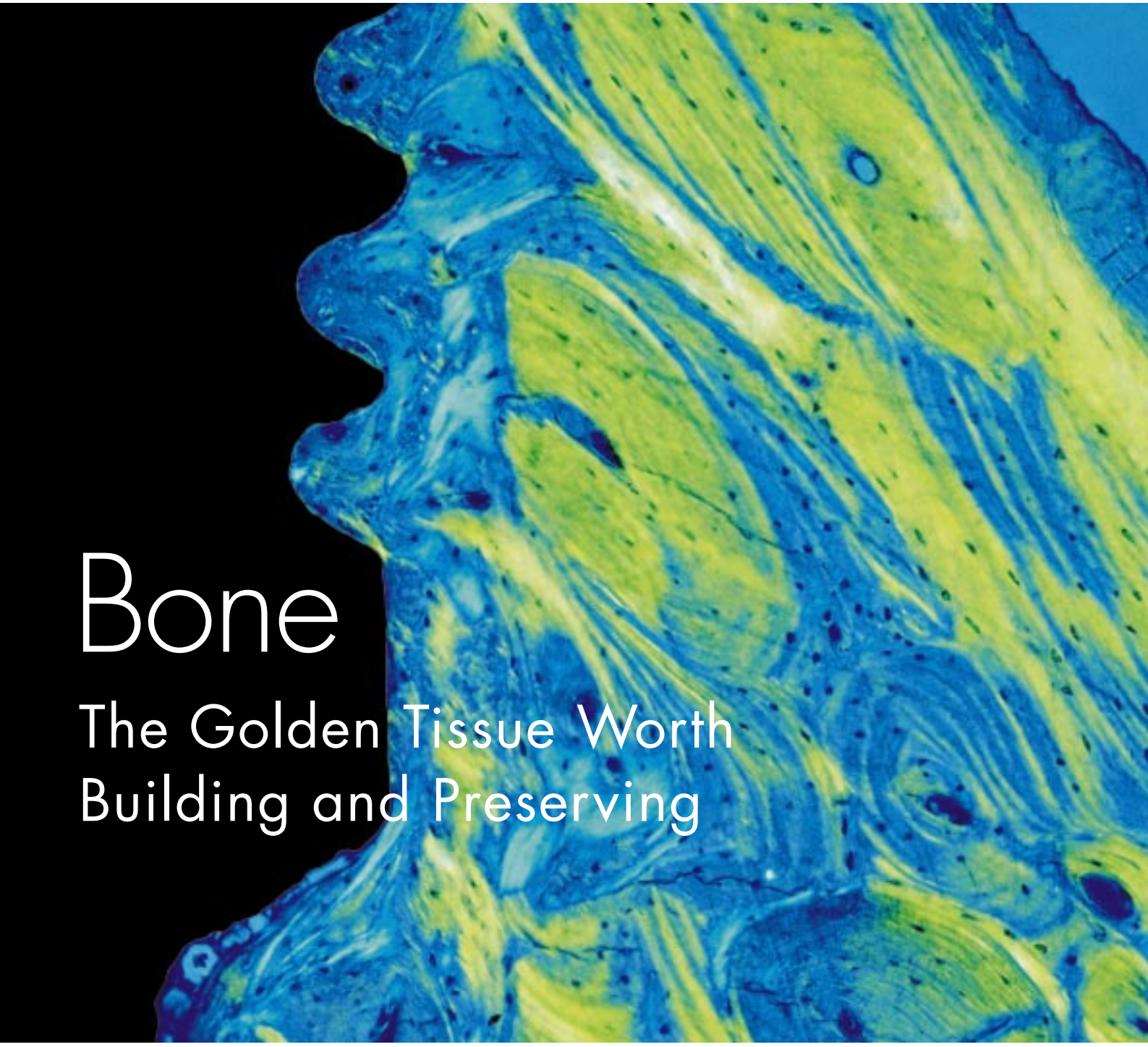
INSIGHT
THE PUBLICATION FOR THE DENTAL IMPLANT TEAM

3:2

Volume 3. Issue 2. 2000



Bone

The Golden Tissue Worth Building and Preserving

ASTRA
ASTRA TECH

Publisher
The Astra Tech Insight is published and distributed world-wide by Astra Tech AB, P.O. Box 14, S-431 21 Mölndal, Sweden. Astra Tech is a company in the AstraZeneca Group.

Editor-in-chief
Mia Jensen, DDS
Clinical Information Manager, Astra Tech AB

Associate editor
Anders Holmén, DDS
Medical Director, Astra Tech AB

Contact us
Editors can be reached at the above address and at editor.insight@astratech.com. Please mail your questions, opinions and thoughts on the Astra Tech Insight

Subscription
Contact your local office or the Astra Tech main office directly on the above mentioned address.

Translations
Astra Tech Insight is translated to several languages, such as French, Spanish, Italian, Russian, Danish and Japanese.

Editorial content
Although great care has been taken in compiling and checking the information given in this publication to ensure it is accurate, the publisher shall not be held responsible for the continued currency of the information or for any errors, omissions or inaccuracies in this publication.

The opinions expressed in this publication are not necessary those of the publisher or editor-in-chief.

Submitted material will be stored electronically for the possibility of publication on the Internet, reprints and in other manners.

Editorial content developed in conjunction with Adis International Limited, Chowley Oak Lane, Tattenhall, Chester, CH3 9GA, UK.

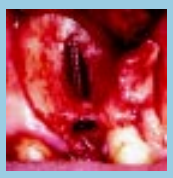
Layout
Layout developed with assistance of the advertising agency Explicit & Partners, Gothenburg, Sweden.

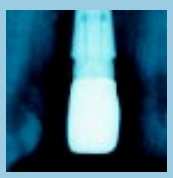
Printing
Printed in Sweden by Typografia Olsén AB.

ASTRA
ASTRA TECH

INSIGHT #3:2

Contents





Cover: Astra Tech Fixture ST in poliarized light.

BONE TRAP

SPECIAL TOPIC

Björn Larsson
International Product Manager, Dental
Astra Tech AB

BoneTrap™ is a device for easy and efficient harvesting of bone particles during implant surgery. It is single-use and sterile with no need for cleaning or re-sterilization. With BoneTrap, bone that otherwise might be wasted can be collected. The BoneTrap is an easy way to ensure that autogenous bone is always available.

Don't Waste Bone – Use it!

The clinical need for bone augmentation

Bone augmenting procedures have become widely used in implant treatment. The aim of augmentation is to create predictable function and esthetics in cases with insufficient bone quantity. Management of such compromised situations is a challenge and has resulted in a number of clinical protocols involving augmentation techniques and procedures, ranging from minor augmentation of localized defects to major augmentation procedures involving on-lay, distractions and sinus lifts. In almost all these cases there is a need for bone material or bone substitutes.

Even though extensive research during the last decade has focused on developing alternative materials, autogenous bone is still regarded as the ideal material for bone augmentation. Currently several devices for collection of bone particles are available but being fully or partially reusable they tend to become expensive. They also demand thorough cleaning and sterilization to avoid bacteria and organic material transfer between patients. The central issue is the need for simple, reliable methods to harvest bone whilst minimizing trauma to the patient.

BoneTrap – the ultimate bone collector

BoneTrap has been developed by Professor Dan Lundgren in the Department of Biomaterials/Handicap Research at Göteborg University, Sweden. The present design is approved as a medical device by the FDA and European authorities.

No clogging of the filter

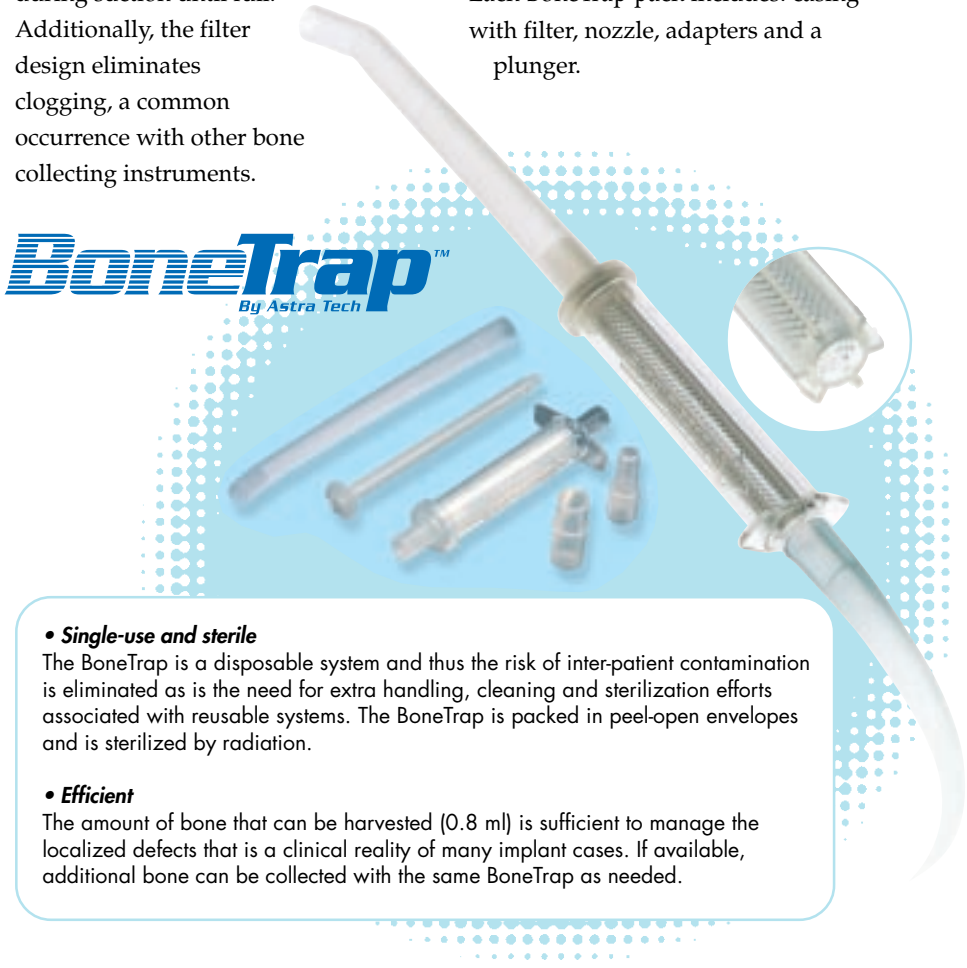
The filter is designed to ensure efficient harvesting of small bone particles and ensure a constantflow during suction until full. Additionally, the filter design eliminates clogging, a common occurrence with other bone collecting instruments.

Easy to use

BoneTrap can be easily attached to your suction system using a dispos–able tube for which adapters are supplied to fit different tube diameters.

Product description

The BoneTrap is manufactured in plastic (polypropylene and oroglass), has a maximum volume of 0.8 cc (ml) and is provided in boxes of 10 units. Each BoneTrap pack includes: casing with filter, nozzle, adapters and a plunger.

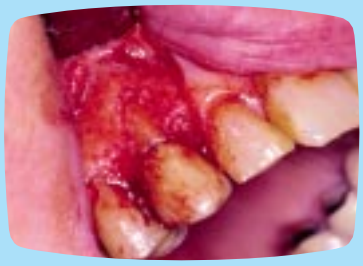


- ***Single-use and sterile***

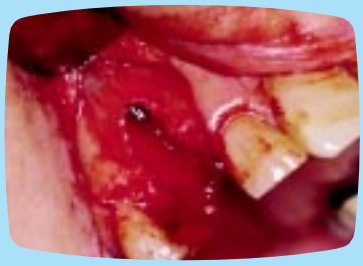
The BoneTrap is a disposable system and thus the risk of inter-patient contamination is eliminated as is the need for extra handling, cleaning and sterilization efforts associated with reusable systems. The BoneTrap is packed in peel-open envelopes and is sterilized by radiation.

- ***Efficient***

The amount of bone that can be harvested (0.8 ml) is sufficient to manage the localized defects that is a clinical reality of many implant cases. If available, additional bone can be collected with the same BoneTrap as needed.



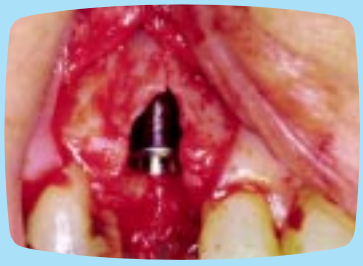
1. Upper right canine with a root fracture and marginal bone resorption on the buccal side.



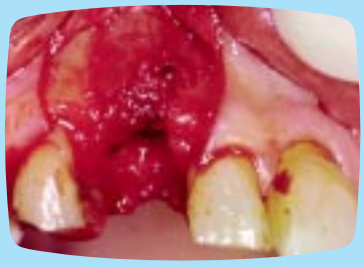
2. Alveola following careful extraction.

3. Bone particles are collected during preparation of the implant site using BoneTrap™.

4. After disconnection of the BoneTrap, a plunger is inserted and the collected bone mixture pressed out.



5. An Astra Tech 4.5 x 15-mm fixture ST has been installed. Note the dehiscence on the buccal side.



6. Bone particles are mixed with blood and packed on and around the implant.

Augmentation of Local Alveolar Ridge Defects

BONE TRAP

CLINICAL REPORT

Dr Lars Rasmusson, DDS, PhD
Department of Oral and Maxillofacial Surgery, Göteborg University, Sweden

For the last three years, we have used BoneTrap™, a disposable device for collecting bone particles, to collect bone chips during drilling of implant sites. The bone particles have been used to augment alveolar defects and cover exposed implant threads without the use of membranes. The following article presents a biological background to our clinical experiences with the BoneTrap device.

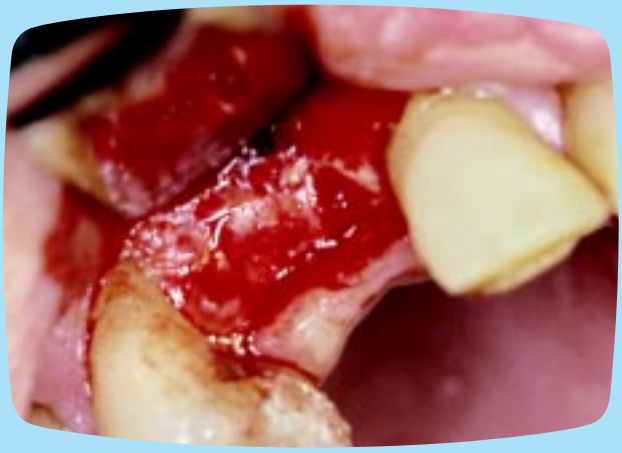
Local alveolar ridge defects

A prerequisite to successful, secure anchorage of oral implants is a sufficient volume of healthy bone. In situations where the dimensions of the jaw bone are less than or equal to those of the implant, implant installation may not be possible, or may result in parts of the implant not being covered by bone. Exposed threads have been speculated to cause mechanical irritation of the surrounding soft tissues and may result in inferior mechanical stability of the implant. Moreover, localized bone defects and exposed implant threads are often esthetically undesirable. It has been suggested therefore, that for a favorable outcome, there should be at least 1 mm of supporting bone at the lingual/palatal and facial aspects of the implant.

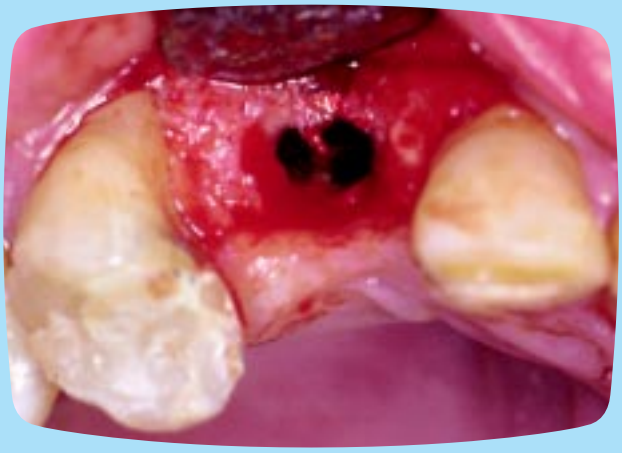
Bone augmentation techniques

Several techniques for local bone augmentation and regeneration of bone defects have been described in the literature. The use of autogenous bone grafts as well as bone substitute, guided bone regeneration (GBR), and combinations of these techniques have been suggested.

The use of allografts, such as frozen, freeze dried, mineralized or demineralized bone are alternatives to autogenous bone grafts in reconstructive



7. The same site after 6 months of healing. The bone graft is well integrated.



8. Due to bone growth over the cover screw, bone has to be removed before changing to abutment.

oral and maxillofacial surgery. By definition, an allograft is a substitute for an autogenous bone graft derived from bone tissue of an individual of the same species and contains no viable cells. The principles of incorporation of allografts follow the same principles as for the autogenous bone graft but the process takes place more slowly due to absence of living bone cells. Fresh allografts can be expected to have a higher osteoinductive capability but are complicated to use for immunological reactions. Bovine xenografts, are also complicated to use in reconstructive surgery as a result of strong immunological reactions. If such xenografts are used, all proteins must be extracted. Xenografts can therefore only be osteoconductive and will be resorbed and replaced by new bone very slowly. The healing and incorporation processes of free autogenous bone grafts are influenced by factors such as surgical technique, rate and extent of revascularization, embryonic origin of the graft, degree of stability, extent of soft tissue ingrowth, presence of growth factors and cell survival within the graft. It has been concluded that a gentle surgical technique with a minimally traumatized graft showed a faster remodelling and a shorter revascularization time compared to a traumatized graft. Blood supply from the recipient bed is crucial for graft repair as well as the ability of newly formed vessels to penetrate the graft.

The revascularization process differs between cortical and cancellous bone grafts due to their different morphologies. Bone collected during preparation of implant sites in the mandible will contain more cortical bone compared to bone collected from the maxilla. Moreover, the vascular supply from surrounding recipient bone differs between maxilla and mandible. Hence, mandibular bone grafts can be expected to be incorporated and remodelled in a different way to maxillary bone grafts.

BoneTrap

Several devices for collection of bone particles are available. Reuseable versions tend to be expensive and demand thorough cleaning and sterilization to avoid transfer of bacteria and organic material between patients.

The BoneTrap is disposable, delivered in a sterile package and consists of an outer and inner casing, a plunger and a nozzle, all in plastic. The device is connected to a suction tube and an arrow assists correct assembly. Only blood and bone particles should be collected and suction of saliva should be avoided. To facilitate this, a parallel suction tube may be used. When the suction capacity decreases, the casing is full and the device is disconnected. The plunger is inserted at the back of the casing and the bone particles can now be pressed out and applied where needed. If necessary, this procedure could easily be repeated.

Clinical Study on Bone Augmentation

BONE TRAP

DOCUMENTATION

Dr Göran Widmark, DDS, PhD
Department of Oral and Maxillofacial Surgery, Mölndal Hospital, Sweden

Dr Carl-Johan Ivanoff, DDS, PhD
Department of Oral and Maxillofacial Surgery, Mölndal Hospital, Sweden

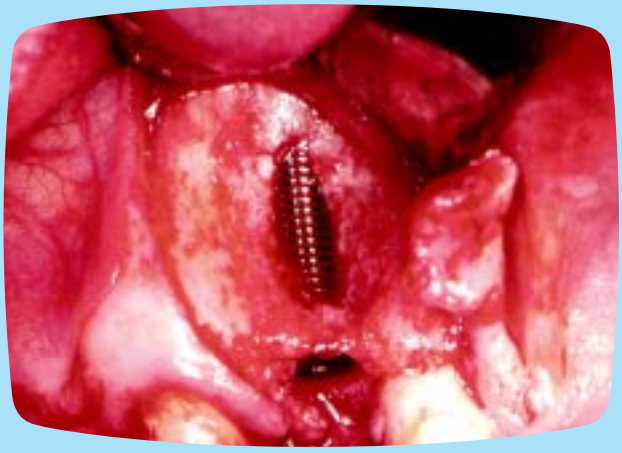
At the Department of Oral and Maxillofacial Surgery, Mölndal Hospital, Sweden, a study has been performed to investigate the possibility of using bone chips, collected with the Astra Tech bone suction device, BoneTrap™, to cover perioperatively exposed implant threads.

Investigators *Dr Göran Widmark* and *Dr Carl-Johan Ivanoff*, explain how they conducted the study.

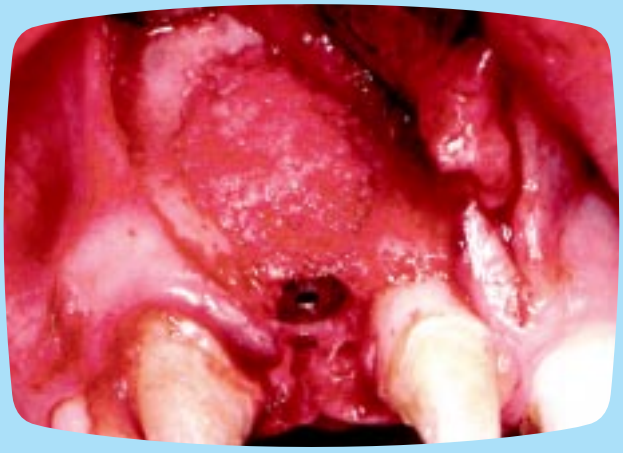
"In 21 patients undergoing implant treatment, exposed threads were visible either as marginal dehiscence defects or buccal fenestration defects at the time of implant installation. During drilling of the implant sites, bone chips were collected with the BoneTrap device. The number of exposed threads varied between 4 and 14, and all but one implant was placed in the anterior maxilla. Implants with exposed threads were recorded photographically. The exposed threads were completely covered with tightly packed bone chips and the periosteum and soft tissues were readjusted to cover the implants. Site evaluation with respect to bone formation was performed 6 months later during second-stage surgery."

What was the outcome? Was there any bone regeneration on the previously exposed implant threads?

"We obtained very successful results. In 12 of the 21 implants we registered complete bone coverage of the exposed threads, and in 6 sites there were only one or two threads that were not completely covered. All sites showed definite improvement in coverage of



The implant showing the buccal fenestration defect.



The fenestration covered with bone chips.

exposed threads. The newly formed bone covering the previously exposed threads appeared to be similar to the surrounding bone, with a hard surface that could withstand probing. Mean bone gain was calculated as percentage gain (remaining threads/initial threads) and was found to be 81% in the sites with marginal defects and 82% in the sites with fenestration defects."

Did you treat the harvested bone in any special way?

"No, we followed the directions from the manufacturer. In order not to contaminate the bone chips an additional suction device should ideally be used for evacuation of saliva. The harvested bone was thus mixed with a small amount of blood before it was tightly packed into the defects and the soft tissue was readapted."

Are there any advantages to augmentation with autogenous bone?

"Compared to guided bone regeneration using membranes, autogenous bone collected with the BoneTrap device may decrease infection risk and serve as a cost-efficient alternative to membranes and/or bone substitutes. Furthermore, the use of autogenous bone eliminates the risk of disease transmission that may be associated with bone substitution materials."

What are the indications for covering exposed threads?

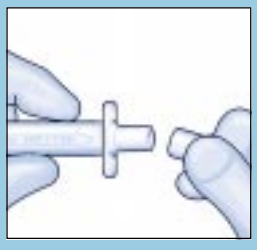
"Bone augmentation of exposed threads may increase implant stability, create a favorable situation for the soft tissue and hence optimize esthetics."

Do you find this a valuable treatment that might be widely used in the future?

"Yes, even if we had no control group in this study it has been previously shown that little or no bone regeneration occurs at exposed implant threads. We were able to prove that, by using bone chips collected with the BoneTrap device, it is possible to achieve a fairly substantial amount of bone regeneration at perioperatively exposed implant threads. However, how the newly formed bone responds to functional loading remains unclear. The BoneTrap is also useful in other applications, for example bone harvesting from the mandible in conjunction with different augmentation procedures."

Instructions for use

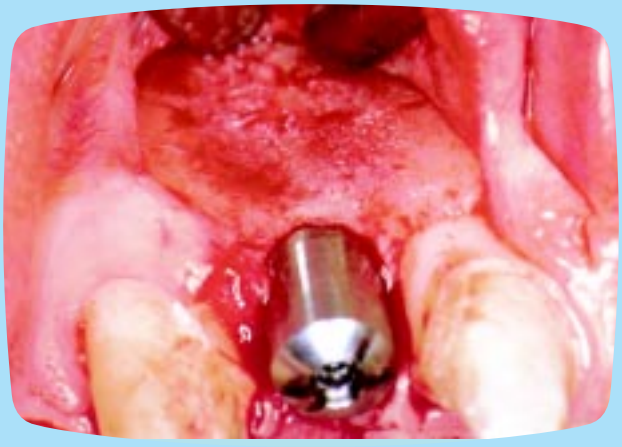
BoneTrap™ By Astra Tech



1. Attach BoneTrap™ to the ordinary suction tube.

2. Collect bone while drilling.

3. Empty BoneTrap and deposit the collected bone material at the intended site.



The defect covered with good quality bone at second-stage surgery 6 months later.

Summary

AIM: To investigate the coverage of exposed implant threads using autogenous bone in the form of bone chips collected with BoneTrap.

MATERIALS & METHODS: Bone chips were collected with BoneTrap during drilling of implant sites in patients (n=21) with 4–14 exposed implant threads either as a result of marginal dehiscence defects or buccal fenestrations. Bone were subsequently packed to cover exposed threads at implant installation.

RESULTS: Evaluation after 6-months follow-up revealed 81%–82% coverage with good quality bone at the defects.

CONCLUSION: By collecting bone chips with BoneTrap it is possible to achieve substantial amounts of bone regeneration on exposed implant threads in a safe and reliable way.

Mia Jensen, DDS
Clinical Information Manager, Dental
Astra Tech AB

Believing that a well-informed patient is a prerequisite to successful implant treatment, Astra Tech has produced a new set of patient information material. The 32-page brochure covers the possibilities afforded by implants, how treatment is carried out and what to expect. A folder containing a summary of this information has been prepared for the waiting room, together with a stand fitting both brochure and folder. Both the brochure and the folder can offer a possibility for branding with the dentist or clinic logo.

Inform Your Patient and Promote Your Clinic

Individualized treatment

The brochure contains interviews with five patients and explains the features, functions and advantages of implant treatment with the Astra Tech Dental Implant System. Treatments such as single tooth, partial restorations and full bridges, as well as implant-supported dentures are described in the fully illustrated text. Photographs show the esthetically pleasing outcome.

Treatment is introduced in a step-by-step scheme presenting both one-stage and two-stage treatment. The choice of treatment option depends on the clinical situation but the flexibility of the Astra Tech Dental Implant System permits the best individual solution possible for the patient.

There is also a section left blank for personal questions or for individual advice from the treating dentist. In the section with questions and answers, Q & A, many of the patient's concerns are addressed and, by introducing a glossary at the end, the information on dental implant treatment is both complete and understandable. The brochure is intended to be handed out by the dentist to patients seriously considering or about to undergo implant treatment.

Promotion possibility

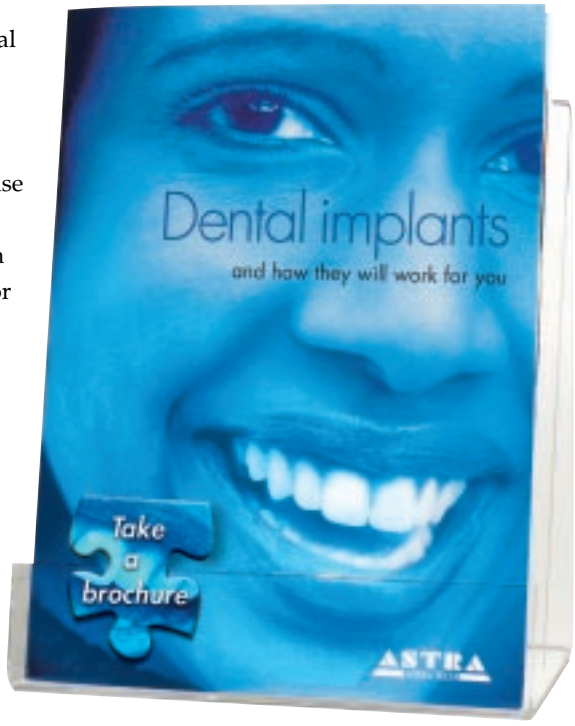
Astra Tech also offer the unique possibility of promoting the individual dentist or clinic with space on the back cover of the printed material that can be used for individual labeling by the dentist, if so desired.

To increase interest in and raise awareness of dental implant treatment, Astra Tech offer an eight-page folder intended for the waiting room and hence is accessible to all patients. The folder is based on the brochure and presents the options and benefits of dental implant treatment in a more general way.

The folder and brochure can be presented on a smart Plexiglas stand which can be wall-mounted or placed on a table to make an informative and attractive addition to the waiting room.

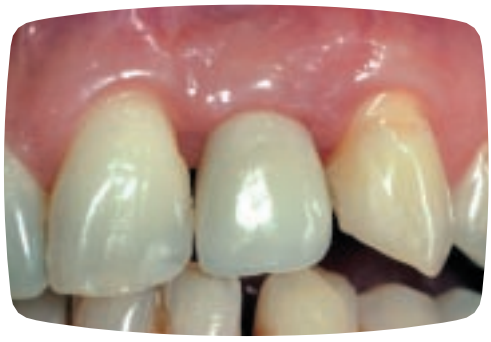
All material is translated into several languages such as French, Italian, Spanish, Finnish, Norwegian, Danish, Swedish, Japanese and others to meet all patients' needs.

If you are interested in ordering, please contact your local Astra Tech representative.



Single Tooth Implants

– A Five Year Prospective Study



Astra Tech Fixture ST restored with a bonded crown. The soft tissue profile is good and there is no sign of inflammation.

Radiograph of the implant above. The crestal bone is close to the head of the implant and has remained stable through-out the study period.

This study by RM Palmer, PJ Palmer and BJ Smith has recently been published in Clinical Oral Implants Research, 2000:11. The most important clinical findings are outlined below.

CLINICAL RESEARCH

PJ Palmer, BBS, MSc, MRD, RCS
Guy's, Kings and St Thomas's Hospital School of Medicine and Dentistry, London

Single tooth implants have been in use for many years but there are few prospective studies in the dental literature. The Astra Tech Fixture ST constitutes a considerable change of philosophy in that it was specifically designed as a single tooth replacement from the outset in an effort to make this most demanding of implant treatments as simple and predictable as possible. The most significant features are the TiOblast™ surface, the coronal flare from 3.5-mm to 4.5-mm incorporating a microthreaded surface and an internal antirotational abutment/fixture junction at the base of the conical seal. This study was designed to replicate conditions within a normal practice environment treating 15 patients who attended with single missing units in the anterior maxilla. They were evaluated clinically and radiographically but no sophisticated ridge mapping or sectional tomographic techniques were employed. No pre-implant ridge augmentation and no bone grafting was allowed.

All patients were treated using the standard protocol for the ST implant with both clinical and radiographic data recorded at base line and yearly intervals throughout the study. Stage 2 surgery involved full exposure of all aspects of the fixture head for clinical readings.

The most striking result from the study is the stability of the crestal bone level around all the implants throughout the entire study period. Of the 14 subjects available for re-evaluation at the five year interval none showed any sign of significant crestal bone loss with most implants retaining bone very close to the most coronal microthreads of the implant. In 5 patients the bone margin stabilised at the top of the implant throughout the 5 years. This indicates that the soft tissue biological seal was located on the abutment/crown. This feature is not seen in other implant systems and is probably a result of the highly effective implant/abutment seal which was achieved and left undisturbed from abutment connection surgery. The excellent bone response may also be due to the affinity of the bone to the implant surface, the TiOblast surface with it's 5 micron pits or the microthreads themselves may provide surface characteristics which encourage osseointegration during healing and thereafter maintain it during the loading phase.

Clinically all the restorations had provided good function with only one porcelain fracture and one abutment loosening throughout the study period. Given that the abutment screw is only tightened by hand in the Fixture ST this is a very low incidence and is probably attributable to the internal conical seal design of the abument implant interface. Over the study period the gingival tissues have also remained stable around all the implants with no recession or significant pocketing present.

The results of this study show that in a small population the Astra Tech Fixture ST provided an excellent means of replacing single units in the anterior maxilla with very few problems and in a highly predictable manner.

Summary

AIM: Investigate the possibility of simple and predictable replacement in a most demanding situation, such as single tooth in the anterior maxilla.

MATERIALS & METHODS: Astra Tech Fixture ST implants were placed in 15 patients with single missing units, using standard protocols.

RESULTS: Re-evaluation after a 5-year follow-up period revealed no sign of crestal bone loss, gingival tissues remained stable and bone remained close to the most coronal part of the implant.

CONCLUSION: The Astra Tech Fixture ST offers an excellent means to replace single units in the anterior maxilla with very few problems and in a highly predictable manner.

Implant Surfaces and Bone Formation

Recently, osseous augmentation during implant therapy is becoming the norm, not the exception. In my own practice, osseous augmentation procedures are required in one third of patients, thus I have been given the opportunity to present an up-to-date review on bone biology as it relates to implantology. The topics covered include the remodeling processes and how implant surfaces can affect the bone regeneration process.

CLINICAL REPORT

Leo I. Kupp, DDS, Ph.D
Director, Graduate Period. Program
The Ohio State University-College of Dentistry, USA

Bone Formation

At the macroscopic level two forms of bone are evident; compact (cortical) and trabecular (cancellous) bone. The smallest individual functioning unit of bone is the osteon, which consists of a central Haversian canal containing blood vessels and connective tissue. The central canals are surrounded by concentric layers of osseous lamallae containing osteocytes joined together by cytoplasmic processes.

At the microscopic level two types of bone can be identified; lamellar (mature) and woven (embryonic) bone. Lamellar bone is characterized by oriented collagen bundles formed in apposition to an existing surface. The characteristic banding pattern of lamellar bone seen under polarized light is due to osteoblasts assuming a distinct three-dimensional orientation while forming a continuous layer of osteoid in a directional fashion. In contrast, woven bone is composed of randomly arranged collagen bundles that are formed by irregular extensions of bone matrix or osteoid. Woven bone can also be seen in mature bone during states of rapid growth, bone repair or rapid bone turnover but is usually replaced by lamellar bone once growth or regeneration is completed.

Bone is continuously undergoing remodeling by resorption or deposition. The main cells involved are osteoclasts and osteoblasts. Osteoclasts break down bone matrix and minerals and are mono- or multi-nucleated cells, usually seen in resorption lacunae. They are highly mobile and go through active and resting cycles with active osteoclasts being confirmed by the characteristic appearance of a "ruffled" border. There are three main types of osteoclastic resorption: 1) shallow and hook, 2) lucunar and 3) tunneling or resective resorption. Osteoblasts are the principal cells for bone formation and are usually arranged in a palisade-like manner.

Bone formation by osteoblasts happens in two stages; matrix or osteoid is laid down which is then followed by a mineralization or calcification stage. The connection between bone resorption and formation is tightly controlled by both systemic and local factors (see Table 1). Future osseous graft materials will attempt to exploit the cellular mechanisms involved in bone growth e.g. growth factors such as Bone Morphogenic Protein-2 and 7 (BMP-2, -7) are being incorporated into osseous graft matrices and are currently in clinical trials. Presently it is difficult to draw conclusions about the superiority of one bone graft material over another, but implant survival rates in grafted bone are very high.

Implant Surface Characteristics and Bone

In order for optimal bone formation to occur, a series of events is required (see Table 2). In general, these events are protein adsorption, cellular adherence, local factor production, proliferation, differentiation, osteoid production, and calcification.[1] Surface energy, surface roughness and composition of the implant may play a major role in determining which plasma proteins and molecules are adsorbed onto the surface. This early phase of healing influences which cells are able to adhere to, and therefore the type of tissue formed, at the implant/bone interface. It is this combined effect of

Table 1: Systemic and local factors in bone regulation

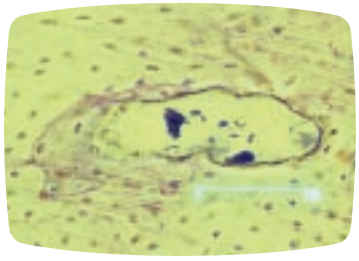
+ Systemic Factors	*– Systemic Factors*
PTH (intermittent)	PTH (continuous)
↑ Ca^+ and 1,25 Vit D_3	Glucocorticoids
HGH	↓ Ca^+ and 1,25 Vit D_3
Estrogen	
Calcitonin	
Thyroxin (T_3 T_4)	
+ Local factors	***– Local Factors***
PDGF α, β	TNFα
FGF	IL-1, IL-6
IGF1	IFNδ
TGFβ and BMPs	PGE_2 and arachidonic acid derivatives

Table 2: Implant/bone interactions for integration

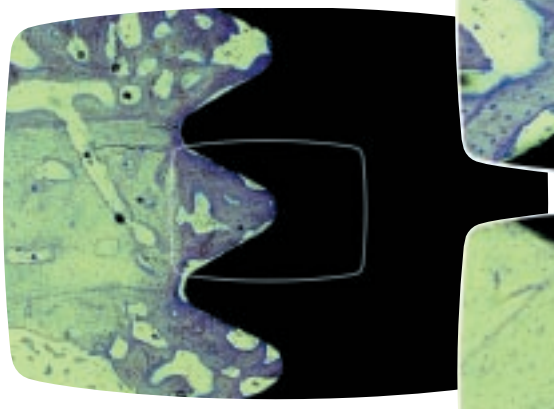
1. Protein adsorption
2. Cellular adherence
3. Local factor production
4. Proliferation
5. Differentiation
6. Osteoid production
7. Calcification

Light microscopical pictures of undecalcified cut and ground sections (10 µm), histologically stained with Toluidine blue mixed with pyronin G.

Figures provided in courtesy of Associate Professor C.B. Johansson, Göteborg University , Sweden.

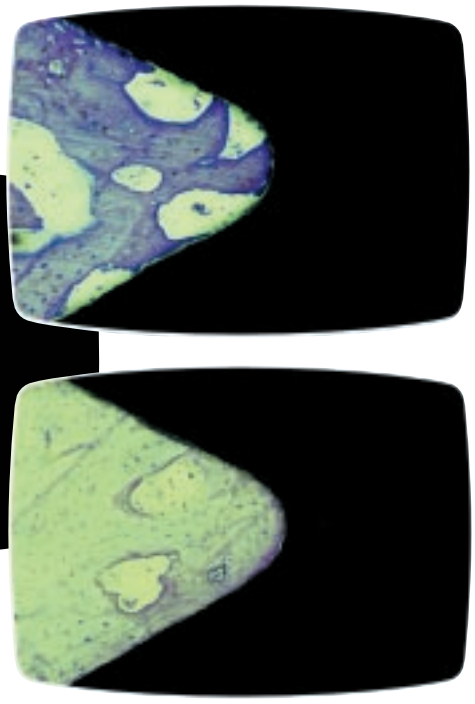


Remodelling cavity in rabbit cortical bone. Left side: osteoid rim covered with osteoblasts. Right side: ongoing resorption of the bone surface by osteoclasts (bar=1000 µm).



Survey of picture of c.p. titanium implant after 1 month insertion in rabbit cortex. The periosteal tissue formation is well pronounced and reveals an area of more callus like bone/immature bone. An endosteal tissue formation can also be observed.
The original cortical bone is paler stained as compared to the darker staining of the more immature bone. Magnification = distance between the thread peaks = 600 µm.

Cut and ground section after 1 month insertion in rabbit cortical bone: New formed, less mature bone can be observed in close vicinity to the c.p. titanium implant surface (black). Original magnification = X400.



Cut and ground section after 3 months insertion in rabbit cortical bone: Mature bone (paler staining intensity as compared to the 1 month sample) can be observed in "direct contact" with the implant surface (black). Original magnification = X400.

implant material and early responding cell populations that dictates the long-term healing response to implants.[2]

Implant surfaces should promote production and release of growth factor profiles which enhances osteogenesis and inhibits bone resorption. Immediately upon implantation, the implant becomes coated with a layer of organic and inorganic components from the plasma. Further, at least two serum proteins, fibronectin and vitronectin, are involved in the adhesion of undifferentiated progenitor cells. These plasma proteins have arginine-glycine-aspartic acid (RGD) binding site sequences that allow undifferentiated mesenchymal cell attachment via integrin adhesion molecules. Any manipulation of implant surfaces that increases the early attachment of mesenchymal cells could conceivably increase the amount of bone around the implant. Surface roughness and microtexture may also affect cell adherence since the removal torques of both cylindrical and screw-type implants with rough surfaces were greater than those of implants with smooth surfaces. The average length of a mesenchymal cell is about 5–12 mm; therefore, a roughness greater than the cell length would be perceived as a smooth surface by those cells located between adjacent peaks. Further studies are required to prove the theories concerning the mechanisms of how surface properties may promote osseointegration.

At surgical sites the acute inflammatory response includes the release and activation of a variety of cytokines and growth factors which mediate the initial healing events. As a result, osteoprogenitor cells migrate onto the clot and synthesize a collagen network, which becomes the scaffold for wound repair. As the cells differentiate into osteoprogenitor cells and, ultimately, osteoblasts, they continue to produce and respond to local regulatory factors. Local cytokine production determines the quality of bone or scar formation leading to fibrotic encapsulation. Several cyto-kines or factors have ▸

▸been investigated in respect to cell activation and proliferation. Transforming growth factor-b (TGF-b), prostaglandin E_2 (PGE_2), BMP-2, and vitamin 1,25-(OH)2 D_3 all enhance cell proliferation. Undifferentiated mesenchymal cells respond to TGF-b with increased proliferation, but committed osteoblasts and chondrocytes respond to all of these factors with decreased proliferation and enhanced differentiation. Surface roughness may play a role in wound healing and bone growth mediated via prostaglandins, since PGE_2 production is increased around roughened implant surfaces.

In conclusion, bioengineering is the future of implantology. Osseous grafts become enhanced with the addition of growth factors. However, as mimicking the cellular events associated with bone growth is obviously more complex than using a single cytokine or growth factor, and as growth factors are required during specific time points during differentiation, a sustained release system would be more efficient. Future research will help clarify which implant surface characteristics enhance bone growth and increased bone/implant contact.

References

1. Proceedings of the 3rd European Workshop on Periodontology: Implant Dentistry. Eds. Lang, N.P., Karring, T., and Lindhe, J. 1999. Quintessence Publishing Co., Inc. Berlin.
2. Schwartz, Z., and Boyan, B.D. Underlying mechanisms at the bone-biomaterial interface. Journal of Cellular Biochemistry. 1994. 56:340–47.

Welcome to the Implant Educati

EDUCATION

Ingrid Johnsson
Manager Training and Support, Dental
Astra Tech AB

It is with great pleasure that we present the Astra Tech Dental Implant Education Program. This is a comprehensive program designed, in collaboration with leading clinical centers in implant rehabilitation, to impart the knowledge and skills necessary to ensure clinical success when using the Astra Tech Dental Implant System. Moreover, the program provides a pleasant environment in which to combine professional exchange with social enjoyment.

For more information on Astra Tech Dental Implant Education Program, please contact your local Astra Tech representative.

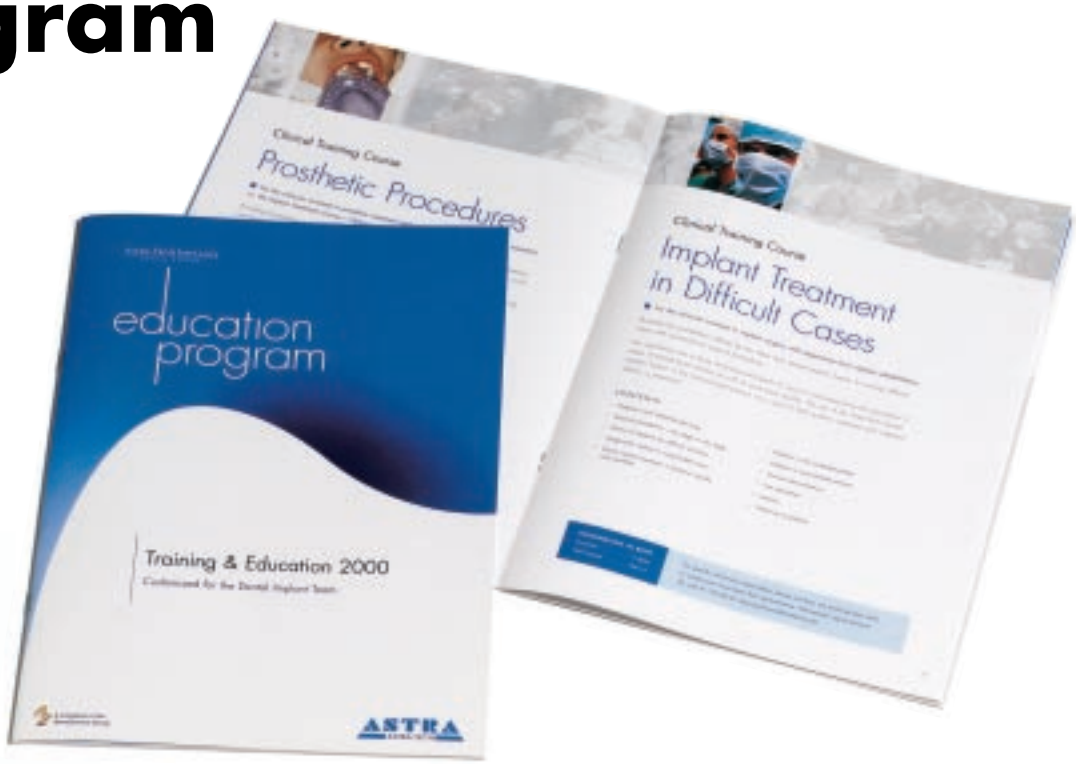
The Educational Program Comprises:

Implant Treatment
Options and Methods (2 days)
For the clinician with no experience in implant rehabilitation and who wishes to start using the Astra Tech Dental Implant System. This course provides basic knowledge in the field of implant rehabilitation whilst focussing on treatment options and treatment planning.

Clinical Training Course
Surgical Procedures (2 days)
The course is directed towards clinicians already involved in implant surgery with some knowledge of implant treatment. Focussing on treatment planning and surgical procedures, the majority of this course comprises live operations for the attendants to observe. The roles of close teamwork and skilled surgical techniques in optimal outcome are emphasized.

Clinical Training Course
Prosthetic Procedures (2 days)
For the clinician involved in prosthetic treatment with some knowledge of implant treatment. The course centers on prosthetic procedures and treatment options in implant rehabilitation. Live patient demonstrations and lectures on patient selection, treatment protocols, follow-up programs and new therapy options are included.

Astra Tech Dental
on Program



Clinical Training Course

Implant Treatment in Difficult Cases (2 days)

This course is directed towards the experienced clinician interested in acquiring more advanced implant procedures in the field of conventional implant surgery, including minor bone grafting procedures. Live operations are the main focus.

Clinical Training Course

Advanced Implant Surgery (3 days)

For the experienced clinician involved in implant surgery. The most advanced surgical course. Live operations and follow-up of various bone grafting procedures will be presented. Experimental and clinical studies on bone grafting will be presented and discussed.

Dental Technician Course

Laboratory Procedures (1.5 days)

For the dental technician with some experience in implant rehabilitation and the clinician with an interest in laboratory procedures. This course presents the advantages and potential uses of the Astra Tech Dental Implant System. Design, investing and casting procedures for suprastructures are discussed and new treatment options and methods presented.

Dental Assistant Course (1.5–2.5 days)

For the dental assistant involved in prosthetic as well as surgical treatment in implant rehabilitation. Provides basic knowledge in implant rehabilitation with an emphasis on guidelines for preoperative planning, follow-up programs and the importance of plaque control. Presentations on surgical and prosthetic procedures, together with live operations and hands-on training, will give a full understanding of the Astra Tech Dental Implant System.

In-Clinic Training Program

Targeted at all members of a team in preparation for the first Astra Tech Dental Implant case and consisting of a tailor-made theoretical information session on products and procedures together with hands-on training. The In-Clinic Training Program entitles the team to enrolment in the Astra Tech Warranty Program.

Customized Program (1–3 days)

This program is fully adapted to meet specific needs from our customers for exchange of international experience in implant treatment.

International Seminars (1–2 days)

Bringing well-known and experienced lecturers to your location to present the latest data on dental implant research as well as the latest clinical techniques in the field of implant rehabilitation.

Product News

Ann Wretlind, CDT, *Therapy Manager, Laboratory, Dental, Astra Tech AB*
Kent Engström, DDS, *Therapy Manager, Prosthetics, Dental, Astra Tech AB*

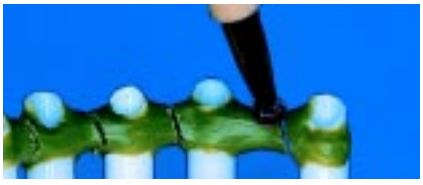
Creating Passive Fit

Skills, choice of materials and teamwork are fundamental in achieving high quality results when working with implant restorations. Additionally, careful adherence to restorative procedures ensures a precise fit and an esthetically pleasing result.

A new manual, Creating Passive Fit, outlines the wax-up and investing procedures for screw-retained implant restorations using the Astra Tech Dental Implant System. The high quality of Astra Tech components ensures consistent results.

The new manual, Creating Passive Fit.

Semi-Burnout Cylinders, firmly attached to Abutment Replicas with Bridge Screws, are cut back to appropriate height.

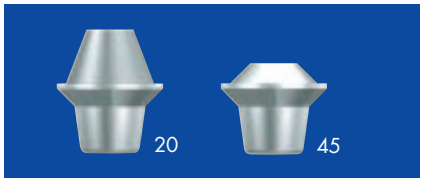


Wax-up with Semi-Burnout Cylinder and GC Pattern Resin LS.

Devesting and clearing screw channels using the Astra Tech Grinding Device.

Polishing Protector

The Polishing Protector is a laboratory component used to protect cylinders during polishing and sandblasting of the framework. It is available in two versions, 20 and 45, to be used in combination with the corresponding cylinders for the 20 and 45 Uni Abutments. The Polishing Protector is a solid, machined component manufactured from stainless steel, with the possibility of screw retention into the cylinders using a Guide Pin or a Bridge Screw. The Polishing Protector is distributed in a package of ten.



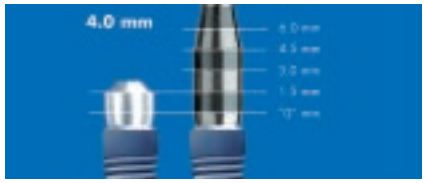
The Polishing Protector is provided in two designs to fit different cylinders – 20° and 45°.

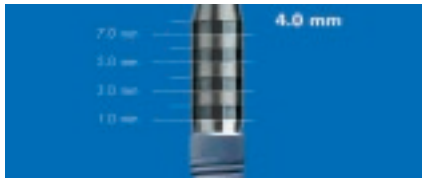
Cylinders can be protected during sandblasting and grinding by using the Polishing Protector from Astra Tech.

Depth Gauge

Two new depth gauges for abutments have been developed to further simplify the choice of abutments. Depth gauge set Uni has two tips for measuring mucosal height for the Uni Abutment and the Uni Abutment ST.

Depth gauge set mm is used to measure mucosal height in millimeters and has three tips for each of the fixtures 3.5, 4.0 and ST. It can be used when working with the Profile BiAbutment, the Cast-to Abutment and the Abutment ST.





FDI Centenary Congress

On November 29 through December 2, 2000, the FDI Centenary Congress takes place. The FDI was founded in France in 1900, exactly 100 years ago, and ADF, the French Dental Association, is now hosting this years FDI Congress bringing it back to Paris again.

Along with other topics, this year´s congress is emphasizing the scientific research and its effect on clinical dentistry and the large exhibition will take place at the same facilities. Several activities will be arranged, such as pre-congress courses, social programme etc.

Astra Tech will take an active part in the conference as a sponsor with an exhibition booth and a scientific workshop. You are encouraged to visit the congress and join the activities arranged by Astra Tech.

Calendar INSIGHT # 3:2

2000

Oct. 14-18	American Dental Association, ADA, *Chicago, IL, USA*
Nov. 12-15	American Academy of Maxillofacial Prosthetics, *Kauai, Hawaii, USA*
Nov. 15-18	American College of Prosthodontists, *Honolulu, Hawaii, USA*
Nov. 15-19	American Academy of Implant Dentistry Annual Mtg, AAID, *Nashville, TN, USA*
Nov. 29-Dec. 2	88th FDI Annual World Congress, *Paris, France*
Dec. 1-2	AAOMS Dental Implant Conference, *Chicago, IL, USA*

2001

Jan. 25-28	Yankee Dental Congress 2001, *Boston, MA, USA*
Feb. 21-24	3rd World Congress of Osseointegration, *Venice, Italy*
Feb. 22-25	Chicago Dental Society Midwinter Meeting, *Chicago, IL, USA*
Feb. 23-24	American Academy of Fixed Prosthodontics, *Chicago, IL, USA*
March 22-24	Academy of Osseointegration, AO, *Toronto, Ontario, Canada*
March 27-31	International Dental Show, IDS, *Cologne, Germany*
May 17-20	California Association of Oral & Maxillofacial Surgeons, CALAOMS, *Las Vegas, NV, USA*
June 27-30	International Association of Dental Research, IADR, *Chiba, Japan*
Sept. 12-16	AAOMS Annual Mtg, *Orlando, FL, USA*
Sept. 13-16	European Academy of Osseointegration, EAO, *Milan, Italy*
Sept. 27-Oct. 1	89th FDI Annual World Congress, *Kuala Lumpur, Malaysia*
Oct. 6-10	American Academy of Periodontology, AAP, *Philadelphia, PA, USA*
Oct. 31-Nov. 3	American College of Prosthodontists, ACP, *New Orleans, LA, USA*

Astra Tech Training & Education Courses, 2000

Sept. 27-29	Advanced Implant Surgery, *Göteborg, Sweden*
Oct. 4-6	Dental Assistant Course, *Göteborg, Sweden*
Nov. 3-4	Dental Technician Course, *Oslo, Norway*
Nov. 9-10	Implant Treatment in Difficult Cases, *Göteborg, Sweden*
Nov. 23-24	Prosthetic Procedures, *Kalmar, Sweden*

Local Astra Tech Companies

Denmark
Astra Tech A/S, Husby Allé 19, DK-2630 Taastrup.
Tel: +45 43 71 33 77. Fax: +45 43 71 78 65.
E-mail: kirsten.herbild@astratech.com

Finland
Astra Tech Oy, PL 27, FI-02241 Espoo.
Tel: +358 9-8676 1626. Fax: +358 9-8044 128.
E-mail: sanna.niini@astratech.com

France
Société de Matériel Médical Astra Tech France, Groupe Pharmaceutique AstraZeneca. 1, rue de l'Union, TSA 90002, FR-92843 Rueil Malmaison Cedex.
Tel: +33 1 41 39 02 40. Fax: +33 1 41 39 02 44.

Germany
Astra Tech GmbH, Postfach 131, DE-65600 Elz.
Tel: +49 6431-98 69-0. Fax: +49 6431-98 69-30.
E-mail: claudia.weidenfeller@astratech.com

Italy
AstraZeneca S.p.A., Palazzo Volta – via F. Sforza, IT-20080 Basiglio, MI.
Tel: +39 0298014372. Fax: +39 0290755615.

Netherlands
Astra Tech B.V., P.O. Box 656, NL-2700 AR Zoetermeer.
Tel: +31 79 360 19 50. Fax: +31 79 362 37 48.

Norway
Astra Tech AS , Postboks 160, NO-1471 Skårer.
Tel: +47 67 92 05 50. Fax: +47 67 92 05 60.
E-mail: dental.no@astratech.com

Spain
Astra Tech S.A. Calle Ciencias nº 73 derecha. Nave nueve Polígono Industrial Pedrosa, ES-08908 L´Hospitalet de Llobregat. Tel. Servicio al cliente : +34.902.101.558
Tel : +34.932.643.560. Fax : +34.933.363.231

Sweden
Astra Tech AB, P.O Box 14, SE-431 21 Mölndal
Tel: +46 31 776 30 00. Fax: +46 31 776 30 10.
E-mail: dentalinfo.se@astratech.com

United Kingdom
Astra Tech Ltd., Brunel Way, Stonehouse, Glos, GL10 3SW.
Tel: +44 1453 791763. Fax: +44 1453 791001.
E-mail: info.uk@astratech.com

USA
Astra Tech Inc., 430 Bedford Street, Suite 100, Lexington MA 02420.
Tel: +1 781 861 7707. Fax: +1 781 861 7787.
E-mail: heather.garrity@astratech.com

Japan
Astra Tech Division, AstraZeneca K.K, Tokyo Regional Office, Koraku Mori Bldg. 18F, 1-4-14, Koraku, Bunkyo-ku, Tokyo 112-0004. Tel: +81 3 5840 1113. Fax: +81 3 5840 1151.
E-mail: saori.aiki@astratech.com

INSIGHT FAX BACK

Name ..... Title .....

Address .....

Postcode/Zip ..... City ..... Country .....

Tel./Fax ..... E-mail .....

☐ I would like to receive further information on the Astra Tech Implants Dental System range of products.

75294-USX-0009