

INSIGHT

THE PUBLICATION FOR THE DENTAL IMPLANT TEAM

SPECIAL ISSUE 2002

*Introducing
Fixture MicroThread™*

Now introducing Fixture MicroThread™

Taking technology to the top



Fixture MicroThread™...	
...the evolution	3
...the product presentation.....	4

...the clinical experience	8
...the scientific background	10
...the engineering.....	14

Publisher

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

Editor-in-chief

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

Associate editor

Anders Holmén, DDS
Medical Director, Dental
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.

Copyright

All rights reserved, including that of translation into other languages. No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording or any information storage or retrieval system, without permission in writing from Astra Tech AB.

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.

Layout

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

Printing

Printed in Sweden by Göteborgstryckeriet.

INSIGHT SPECIAL ISSUE

Contents



Fixture MicroThread™

...the evolution3

Introducing a new innovation into implant dentistry, based on science and documentation.

...the product presentation4

A new product line of fixtures, a new delivery system and some new additional instruments are now launched.

...the clinical experience8

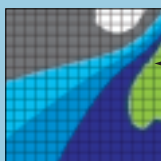
Fixture MicroThread has been clinically evaluated in the USA. Oral surgeons appreciate the new features of the Fixture MicroThread.

...the scientific background.....10

Biomechanical calculations and clinical experience behind the development of Fixture MicroThread.

...the engineering14

One implant but two different thread designs, tailored to preserve bone through mechanical stimulation.



Cover: The Fixture MicroThread has microthread retention elements at the fixture neck, proven to maintain the marginal bone.

Anders Holmén, DDS
Medical Director, Dental
Astra Tech AB

Fixture MicroThread™ An evolution



Again Astra Tech brings a new innovation into implant dentistry and as before it is based on science and documented results.

Basic knowledge about bone physiology and biomechanics has now shown the way for the new Astra Tech fixture, the Fixture MicroThread.

It is not easy to be first and a pioneer but it is challenging to succeed a strong leader and question established "truths". In implant dentistry, one such clinical truth is the so-called marginal bone adaptation that means a reduction of the peri-implant marginal bone level during the initial healing phase. We have been taught to accept a reduction of some millimeters before a steady state is achieved. Today this is no longer the truth.

Fixture MicroThread has captured the fundamental prerequisites for an optimal interaction between the implant and the bone tissue. From being a feature on the conical part of the Fixture ST, the microthread has now been placed on the regular cylindrical fixtures 3.5 and 4.0. The outstanding results from independent clinical

studies with the Fixture ST made it an easy decision to provide all fixtures with a microthread on the coronal portion of the fixture and let it go all the way up to the marginal end. Not only a stable peri-implant marginal bone level but also increased bone quality are now the new truths and the implications from these are easy to understand. We get more bone support on available implant surface, which increases implant stability and survival and we provide the necessary support for healthy and stable peri-implant soft tissues – all absolute prerequisites for predictable long-term esthetic results.

This issue of the Astra Tech Insight presents the Fixture MicroThread. Basic scientific principles are presented together with clinical documentation on Fixture ST and clinical experiences with the new Fixture MicroThread. ■

Tomas Saltvik, DDS
Therapy Manager, Surgery, Dental
Astra Tech AB

Now introducing Fi

It is always exciting to introduce a new product, but in this particular case, the excitement is very large. Never before have we launched a product so awaited and customer driven. We are happy to introduce a new product line – Fixture MicroThread™.

The introduction of cervical microthreads with the Fixture ST in 1994 became a huge success as well as a benchmark in the implant industry.

It also created an explicit and logical demand for this feature, the cervical microthreads, on all our fixtures including the 3.5 and 4.0 mm implants. After some years of research and development and in close contact with our customers we have designed two new microthreaded fixtures with the dimensions 3.5 and 4.0 mm.

We now launch the new product line, a family of four fixtures, that all



Summary

New product line

We now launch a new product line with the Conical Seal Design, the TiOblast surface and the cervical microthreads on all the fixtures. The new Fixture MicroThread is a cylindrical self-tapping fixture with a very large capacity to carry load.

Color-coded package

We also introduce a new delivery system

with pre-mounted fixtures in dry sterilized containers. The package is color-coded for easy handling and storage.

In addition to the present instruments we introduce a complementary new Torque Wrench with a dual function, and some new abutments specifically developed for the MicroThread 4.0 ST.

Fixture MicroThread™

have the three essential design features:

Conical Seal Design™ – for a stable and tight fixture-abutment relation.

TiOblast™ surface – for optimal bone-to-implant relation.

MicroThread™ – the cervical retention elements for biomechanical stress distribution.

The new MicroThread Family consists of four members: Fixture MicroThread 3.5, 4.0 ST, 4.5 ST, and 5.0 ST. The suffix ST indicates that the fixture is designed with an internal hexagonal interface.

Designed for optimal performance

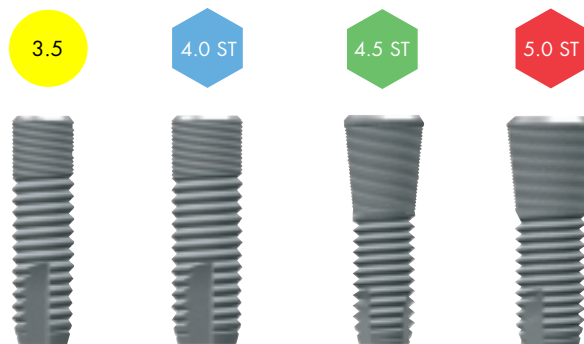
Fixture MicroThread is a cylindrical self-tapping fixture intended for treatment of edentulous or partially dentate patients. It has been designed for optimal performance all the way during installation, healing and in function regardless of surgical protocol. The cervical part of the fixture is provided with a minute threading.

The microthreads improve transmission of load to the surrounding bone. The capacity to carry load is increased, and the marginal bone loss is

for this reason minimized. Reliability as well as long-term predictability is ensured. The macrothreads of the apical part of the fixture gives a firm grip in the bone ensuring initial stability.

Fixture MicroThread has the same TiOblast surface as the other Astra Tech fixtures, giving an excellent bone-implant interlocking. The interface between the fixture and the abutment, the Conical Seal Design is a stable and sealed relation, preventing micro movements and microbial leakage. This well defined conical ▶

Three of the MicroThread Fixtures – 4.0 ST, 4.5 ST, and 5.0 ST – have an internal 'double hex' design, providing indexing of the abutments.





The package labels are color-coded for ease of use.

	Length mm:	8	9	11	13	15	17	19
Fixture MicroThread™	3.5 mm	●	●	●	●	●	●	●
	4.0 mm ST	●	●	●	●	●	●	●
	4.5 mm ST		●	●	●	●	●	●
	5.0 mm ST		●	●	●	●	●	●

relation is self-guiding and there is therefore no need for x-ray verification when the abutment is seated. This makes the procedure simpler and less time-consuming for you, the dentist.

We don't accept bone loss

Our documented success with Fixture TiOblast and Fixture ST regarding the stable bone level provides a solid foundation for our position not to accept the bone loss in the cortical region generally seen after installing fixtures with a machined or polished neck. No marginal bone reduction is

a prerequisite for successful treatment in cases with limited bone available and short fixtures. Maintaining the bone level also provides a healthy foundation for esthetic soft tissue architecture without black triangles.

New package concept

We are also introducing a new patented package system with pre-mounted fixtures in dry sterilized containers. This system will simplify the handling and transportation of the fixtures. The package labels are color-coded with the diameters of the fixture as a base for the coding system.

New and familiar features

Besides the benefits of our new implant system, the clinical procedures remain unchanged. You can still use the same surgical protocols and instruments which give you a comfortable and familiar feeling when using Fixture MicroThread. In addition we are introducing some new items.

One option is the new Torque Wrench with a dual function: torque control and ratchet wrench. This makes it suitable for installation of both fixtures and abutments. The surgeon doing one-stage protocol

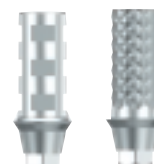
New components



The new Profile Bi-Abutment 4.0 ST.

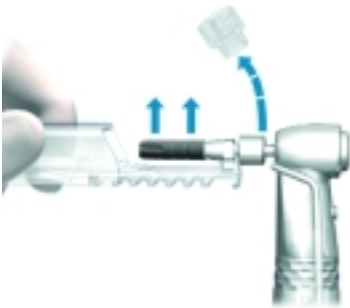


The new Fixture Replica 4.0 has an internal hex, but can be used with for example Uni-Abutment. Note the three stripes instead of two.



Our new Cast-to Abutment 4.0 ST and Temporary Abutment 4.0 ST for Fixture MicroThread 4.0 ST.

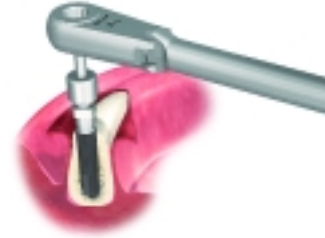
Handling



The Contra Angle with the Handpiece Connector Carrier mounted is used to release the implant. You can also use the insertion head.



Use the Contra Angle to seat the fixture directly, or seat it manually.



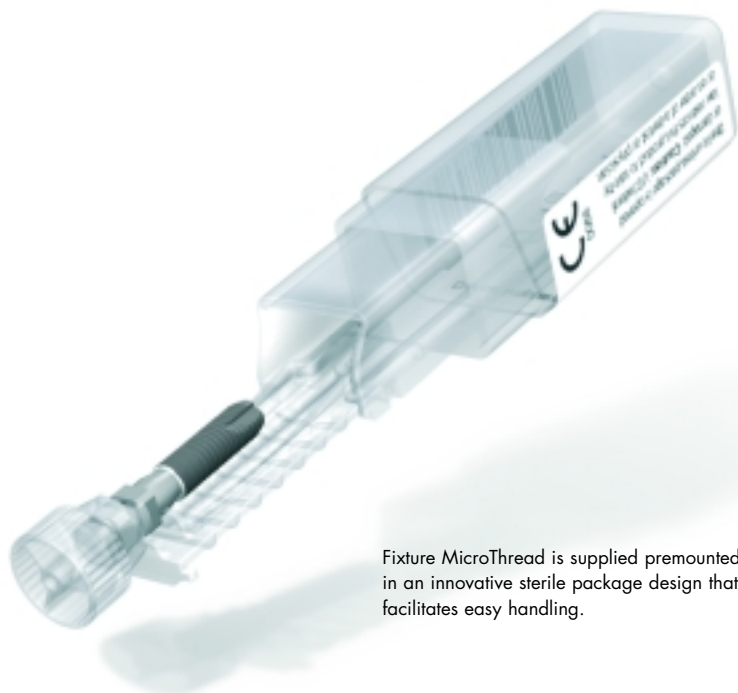
The Torque Wrench can be used for final seating of the fixture.

can easily switch between the functions.

As the new MicroThread 4.0 ST offers indexing and anti-rotation, some new abutments have been developed specifically for the MicroThread 4.0 ST. These include Temporary Abutment, Cast-to Abutment, Profile BiAbutment and Abutment ST in three different heights.

We are convinced that the future will further emphasize the importance of implant design. The success story of Fixture ST already indicates this. We are confident that Fixture MicroThread will enhance your

possibilities to predict long term function and esthetics and improve your patients' quality of life. ■



Fixture MicroThread is supplied premounted in an innovative sterile package design that facilitates easy handling.

Fixture MicroThread™

The Clinical Experience

The new Astra Tech Fixture MicroThread is the implant of choice for almost any clinical situation. The product has been clinically evaluated by oral surgeons and periodontists, and they all agree: When the esthetic demands are relying on predictable long-term soft tissue support, the bone preservation characteristic of the new design is making the choice easy.

The new Astra Tech Fixture MicroThread 3.5 and 4.0 have recently been clinically evaluated in the USA. Insight has met two oral surgeons, Dr Joe Schmidt and Dr Brian Mudd, both involved in the clinical evaluation of Fixture MicroThread 3.5 and 4.0. What is their general impression of the new Fixture MicroThread?

– I'm strongly recommending the referral to use the new MicroThread fixture because I believe it's a better implant, says Dr Joe Schmidt, oral surgeon from Milwaukee. It's nice to see those x-rays where the bone

level is maintained where it's supposed to be.

Ability to preserve bone

During the test period, ending in May 2002, 67 cases have been treated using the new fixtures. Both single tooth restorations, partial and total cases were treated. According to the oral surgeons, the most satisfying aspect of the new Fixture MicroThread is its ability to preserve the bone level at the crest of the ridge.

– This is critical for soft tissue support, which directly affects the

esthetic outcome, says another of the oral surgeons involved in the evalua-

"It's nice to see those x-rays where the bone level is maintained where it's supposed to be."

tion, Dr Brian Mudd of Oceanside, California. For him the Fixture MicroThread is the fixture of choice in almost any clinical situation, but

Summary

The new Astra Tech Fixture MicroThread 3.5 and 4.0 have recently been clinically evaluated in the USA. During the test period, ending in May 2002, 67 cases have been treated using the new fixtures. Both single tooth restorations, partial and total cases were treated.

Most of the participating oral surgeons agreed that the most satisfying

aspect of the new Fixture MicroThread is the documented benefit of a microthread at the fixture neck. Fixture MicroThread is the fixture of choice in almost any clinical situation, but particularly so in esthetically demanding cases where bone tissue support is essential.

particularly so when esthetics demands predictable long-term soft tissue support by the underlying bone architecture.

Dr Joe Schmidt shares his opinion. –It's the bone preservation characteristic of this unique design which I find important, especially in areas of narrow interdental space. You don't have the cupping that you see with regular threaded implants.

Familiar surgical protocol

The new fixture does not require adding of new instruments. The surgical protocol for the Fixture MicroThread is the same as that

for the standard fixture.

– That makes it comfortably familiar the first time one is placed, says Dr Brian Mudd. He thinks the criteria for one-stage surgery and early or immediate loading are more easily satisfied when using a fixture that engages the cortex with microthreads.

Dr Joe Schmidt has increased the use of one-stage surgery and immediate loading.

– I never did that before. Every time I tried that with other systems I have used, I ended up with gross cupping and loss of papilla. But with this system I have had almost no problems.

But the best judgment of all comes from Dr Brian Mudd.

– I will be placing two Astra Tech fixtures for my wife in the near future. I would have no other implant than an Astra Tech Fixture MicroThread. ■

“You don't have the cupping that you see with regular threaded implants.”

Clinical Experience Market Tests

August 2001–May 2002

Objectives

- To check the tactile feeling
- To confirm the primary stability
- To identify any difference compared to Fixture TiOblast
- To collect clinical cases for literature

Participation

- 21 clinics were included
- 238 Fixture MicroThread were used
- 67 cases treated
- Single tooth restorations, partial and total cases were included

Results when comparing Fixture MicroThread with Fixture TiOblast

- Primary stability increased (80%)
- Seating “torque” increased (75%)
- Drilling protocol the same (95%)



Stig Hansson, PhD
Senior Scientific Executive, R&D
Astra Tech AB

Lars Rasmusson, DMD, PhD
Assoc. Professor, Dept Oral & Maxillofacial Surgery
Göteborg University, Sweden

Fixture MicroThread™

The scientific background

Overloading is a major cause of dental implant failure¹. Consequently measures should be taken to enhance the anchorage strength in the bone.

The following design features of Fixture MicroThread aim at increasing the load the implant can resist.

- Retention elements at the neck of the implant.
- A conical implant-abutment interface – Conical Seal Design.
- A microthread of an optimized profile at the coronal part of the implant.
- A macrothread of an optimized profile at the apical part of the implant.
- A rough surface with a suitable microstructure – TiOblast.

Retention elements at the neck

In animal² as well as in clinical studies^{3,4,5,6} it has been found that retention elements at the neck promote maintenance of a high marginal bone level. These findings are in agreement with Wolff's law, which teaches that bone preservation often requires a mechanical stimulation. With retention elements at the neck, more bone is engaged in the support of the implant. In a finite element study it was found that the provision of retention elements at the neck results in a considerable decrease in

the peak bone stress caused by a standardized load⁷. This implies that the load the implant can resist is substantially increased. Fixture MicroThread is equipped with such retention elements at the neck.

A conical implant-abutment interface at the level of the marginal bone

Assuming a high marginal bone level it follows from Saint-Venant's principle⁸ that the way in which a load is applied on an implant, affects the stress pattern in the marginal bone.

Summary

The biomechanically optimized implant

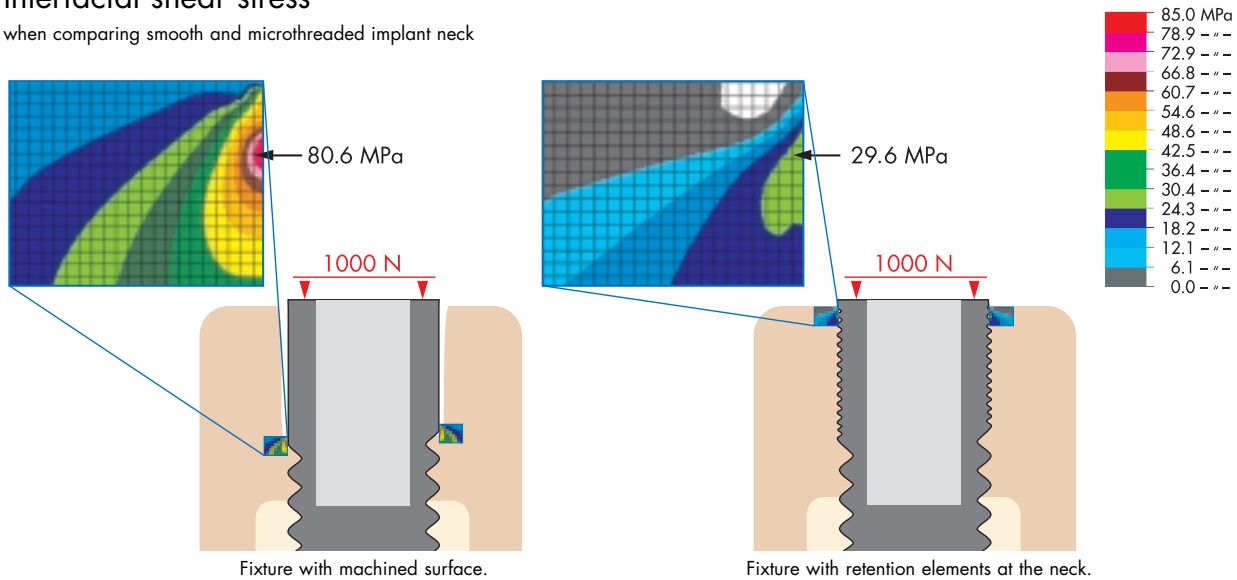
- Preserves the bone by mechanical interaction between implant and bone on a macroscopic as well as a microscopic level. This is achieved through the TiOblast surface and the microthreads of the implant neck.
- Uses all available bone as effectively as possible by reducing and distributing the stress peaks in a more favorable way.

Through finite element studies, the optimal profile and dimensions of the macro- and microthreads were established. The same method was also used to verify the design and location of the conical implant-abutment interface.

International studies show that there is no change in the marginal bone level over a five year period.

Interfacial shear stress

when comparing smooth and microthreaded implant neck



This implies that the marginal bone stresses depend upon the design of the implant-abutment interface. In a finite element study⁹ it was found that a conical implant-abutment interface at the level of the marginal bone brings about a decreased peak bone stress and a more favourable location of this peak stress as compared to an implant-abutment interface of the flat top design. Fixture MicroThread is provided with such a conical implant-abutment interface – Conical Seal Design. In another study¹⁰ it was found that it is important that the conical interface is located within the bone. If the conical interface is displaced 2 mm in coronal direction, high stress peaks occur where the implant enters into the bone.

A microthread of an optimized profile

The retention elements at the neck of Fixture MicroThread are designed as a microthread with an optimized profile. Actually there are three microthreads running parallelly to

each other. A finite element study showed that the capacity of a microthread to resist axial loads can be as high as that of a thread of standard dimensions¹¹. Furthermore the peak stresses in the bone can be reduced by giving the microthread an optimized profile implying that the load the implant can resist is increased.

A microthread has an additional benefit. An important characteristic of a dental implant is the axial stiffness. The higher the axial stiffness, the lower is the peak bone stress caused by a standard load^{7,12}. Keeping the major diameter of an implant the same, a microthread reduces the axial stiffness less than a thread of normal dimensions. This means that a microthread permits the combination of a slim implant, good retention in the bone and a high axial stiffness.

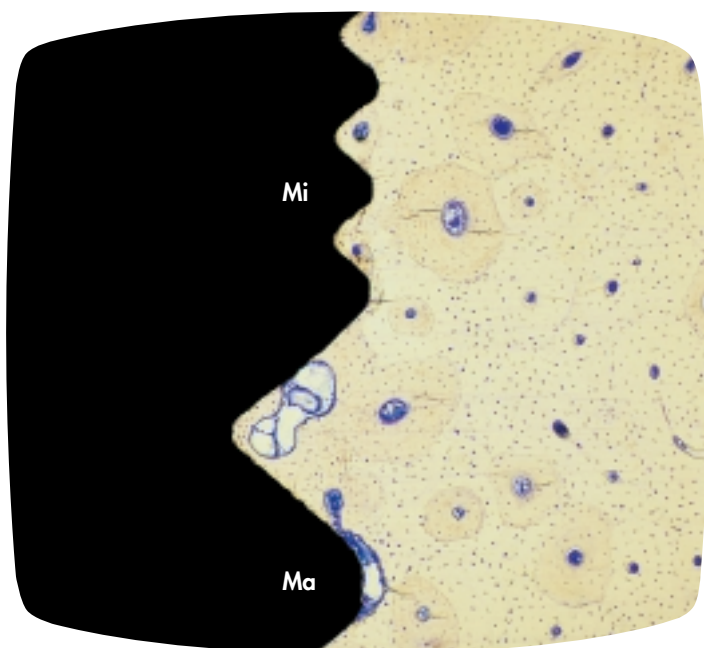
Superior microthreads

The apical part of Fixture MicroThread is provided with a thread of normal dimension. However, also the profile of this thread is optimized¹¹ reducing

the peak stresses in the surrounding bone. The pitch of the macrothread is the same as the pitch of the three parallelly running microthreads.

A rough surface with a suitable microstructure

Fixture MicroThread is provided with a rough surface (TiOblast) produced by blasting with titanium dioxide particles. The rationale of the rough surface is to bring about a strong mechanical coupling between implant and bone also on a microscopic level. The reason for using titanium dioxide as the blasting medium is to avoid contamination of the implant by any foreign material. The blasting produces micropits on the surface. By adjusting the production parameters different pit sizes and pit shapes can be produced. The establishment of the production parameters was guided by a theoretical model¹³ permitting the estimation of the retention capacity in bone of a rough implant surface as a function of pit size, pit shape and pit density. In a study on dogs¹⁴, the TiOblast



Histologic appearance of a beautifully osseointegrated Fixture MicroThread. Ma=macrothread, Mi=microthread.

surface brought about a substantial increase in the fixation strength as compared to a machined surface.

In an experimental study on the effects of implant design and surface on bone regeneration and implant stability¹⁵, TiO-blasted and micro-threaded Astra Tech implants showed a higher degree of bone-implant contact and higher level of bone regenerated at defect sites compared with machined Brånemark implants. This experimental dog study where implants were installed in the mandibular premolar region, also demonstrated a significantly higher increase in stability, as measured with Resonance Frequency Analysis (RFA), for the Astra Tech implants.

In a study on homo¹⁶ where experimental machined micro-implants were used as a reference, a statistically significant increase in bone-to-implant contact and bone filling in

the threads were obtained for micro-implants with the TiOblast surface.

In clinical studies from different centres in the world marginal conditions have been registered for up to 5 years in function for implants with TiOblast surface and microthreads at the neck. Palmer and co-workers¹⁷ followed 14 patients with single-tooth replacement (Fixture ST) for 5 years. Survival rate was 100%, the marginal bone levels was found at a very high level in absolute values and there was no statistically significant change in marginal bone level over this period. In another clinical study by Steveling and co-workers⁶, 44 implants were installed. Survival rate was 100% and the marginal bone loss was only 0.9 ± 0.7 mm after 5 years.

Biomechanical optimization

The biomechanically optimized implant can be described in the following way.

- It preserves the bone by bringing about a beneficial mechanical interaction between implant and bone, on a macroscopic as well as, on a microscopic scale.
- It utilizes all available bone to support the implant.
- It uses this bone as effectively as possible.

The thrust in the development of Fixture MicroThread has been to create such a biomechanically optimized implant. The threads in combination with the TiOblast surface produce the mechanical interaction between implant and bone. The utilization of all available bone in the support of the implant is accomplished by the retention elements at the neck; the microthread together with the TiOblast surface. Finally the effective use of the bone is achieved by the optimized thread profiles in combination with the conical implant-abutment interface at the level of the marginal bone; Conical Seal Design. ■

References

1. Quirynen, M., Naert, I. & van Steenberghe, D., Fixture design and overload influence marginal bone loss and fixture success in the Brånemark system. Clin Oral Impl Res 1992;3:104-111.

2. al-Sayyed, A., Deporter, D.A., Pilliar, R.M., Watson P.A., Pharoah, M., Berhane, K., Carter, S., Predictable crestal bone remodelling around two porous-coated titanium alloy dental implant designs. A radiographic study in dogs. Clin Oral Impl Res 1994;5:3:131-41.
3. Palmer, R.M., Smith, B.J., Palmer, P.J., Floyd, P.D., A prospective study of Astra single tooth implants. Clin Oral Impl Res 1997;8:173-179.
4. Norton, M., Marginal bone levels at single tooth implants with a conical fixture design. The influence of surface macro- and micro-structure. Clin Oral Impl Res 1998;9:91-99.
5. Nordin, T., Jönsson, G., Nelvig, P., Rasmusson, L., The use of a conical fixture design for fixed partial prostheses. A preliminary report. Clin Oral Impl Res 1998;9:343-347.
6. Steveling, H., Roos, J., Rasmusson, L., Maxillary implants loaded at 3 months after insertion: Results with Astra Tech implants after up to 5 years. Clin Impl Dent Rel Res 2001;3:120-124.
7. Hansson, S., The implant neck: smooth or provided with retention elements. A biomechanical approach. Clin Oral Impl Res 1999;10:394-405.
8. Timoshenko, S.P., Goodier, J.N., Theory of elasticity. McGraw Hill International Book Co, Singapore, 1984.
9. Hansson, S., Implant-abutment interface: Biomechanical study of flat top versus conical. Clin Impl Dent Rel Res 2000;2:33-41.
10. Hansson, S., A conical implant-abutment interface at the level of the marginal bone improves the distribution of the stresses in the supporting bone. Clin Oral Impl Res, accepted for publication 2003.
11. Hansson, S., Werke, M., On the role of the thread profile for bone implants with special emphasis on dental implants. In Towards an optimized dental implant and implant bridge design: A biomechanical approach. Thesis Hansson S, Chalmers University of Technology, Göteborg, Sweden, 1997.
12. Mailath, G., Stoiber, B., Watzek, G., Matejka, M., Die Knochenresorption an der Eintrittsstelle osseointegrierter Implantate – ein biomechanisches Phänomen. Eine Finite-Element-Studie. Zeitschrift Stomatol 1989;86:207-216.
13. Hansson, S., Norton M., The relation between surface roughness and interfacial

ASTRA TECH IMPLANTS
DENTAL SYSTEM



Improving Nature

Introducing the Astra Tech Ceramic Abutment

ZirDesign™ – the Ceramic Abutment, offers individually designed prosthetic solutions in the esthetic zone.

Zirconia is the biomaterial of choice for the Ceramic Abutment. It combines mechanical strength and esthetics. The outstanding clinical performance of the Ceramic Abutment is in line with the Astra Tech concept – Simplicity, Reliability, and Esthetics.

Zirconia – esthetically strong





A company in the
AstraZeneca Group

English

shear strength for bone anchored implants. A mathematical model.

J Biomechanics 1999;32:829-836.

14. Gotfredsen, K., Nimb, L., Hjörting-Hansen, E., Jensen, J.S., Holmén, A., Histomorphometric and removal torque analysis for TiO₂-blasted titanium implants.

Clin Oral Impl Res 1992;3:77-84.

15. Rasmusson, L., Kahnberg, K-E., Tan, A., Effects of implant design and surface on bone regeneration and implant stability: An experimental study in the dog mandible. Clin Impl Dent Rel Res 2001;3:2-8.

16. Ivanoff, C.J., Hallgren, C., Widmark, G., Sennerby, L., Wennerberg, A., Histologic evaluation of the bone integration of TiO₂-blasted and turned titanium micro implants in humans. Clin Oral Impl Res 2001;12:128-134.

17. Palmer, R. M., Palmer, P.J., Smith B.J., A 5-year prospective study of Astra single tooth implant. Clin Oral Impl Res 2002;11:179-182

Fixture MicroThread™

The engineering

The new Astra Tech fixture, Fixture MicroThread, is provided with two different thread designs. A microthread on the coronal part of the implant, and a macrothread covering the remainder of the implant. In spite of the difference in size, the pitches of the threads are identical. These are some of the engineering aspects behind the development of our new product line, Fixture MicroThread.

As both the micro- and macro-threaded sections of the implant are cylindrical, the threads will be in close contact with the surrounding bone during the installation procedure. Consequently the pitch of both threads must be identical. But the small dimensions of the microthread would result in a very sparse threading when running with the

same pitch as the bigger macrothread. So in order to densify the microthread, three threads run parallelly to each other. The pitch of the threading is therefore slightly increased from 0.6 to 0.66 mm as compared to the standard thread.

On the Fixture ST, on the other hand, only one microthread runs along the conical section. In this case

the bone is prepared with a conical drill. The implant is mounted until the conical section just reaches the bone. After contact has been established, no major relative movement occurs between the bone and the microthread on Fixture ST. This is why there is no need for identical pitch on the micro- and macrothreads.

Summary

The new Fixture MicroThread has optimized thread profiles. The flank angle is somewhat increased and the depth of the threading is consequently reduced.

The unique combination of micro- and macrothreading and an increased stiffness provide excellent primary stability. The installation properties, torque and tactile perception, give a secure installa-

tion. The microthreaded portion is tailored to compress the cortical bone tissue just so much as to increase the screwing torque but not to damage the bone tissue. This compression can be held smaller than with a smooth implant surface.

Changed features

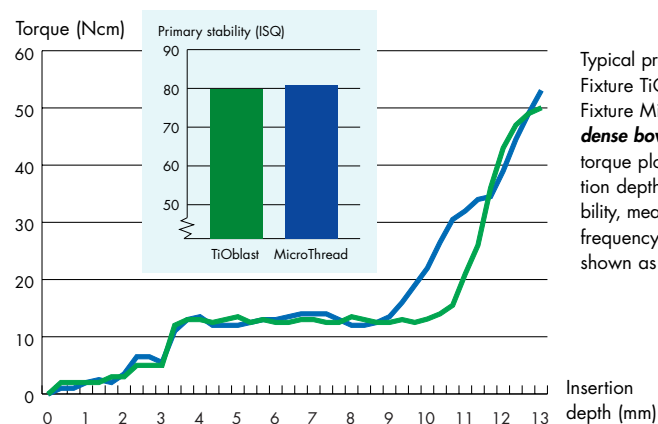
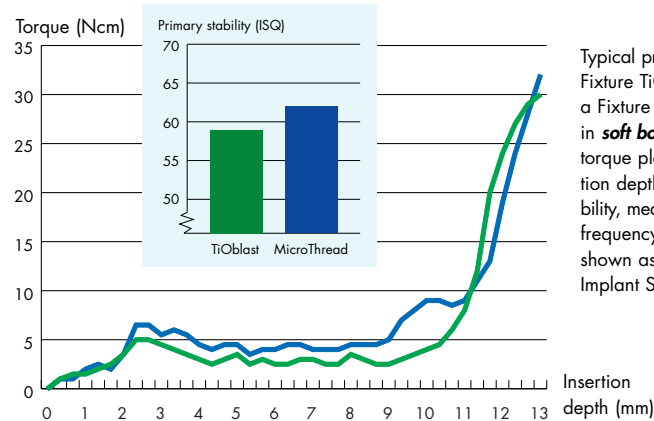
The optimized thread profiles described by Hansson & Rasmusson in this issue of Insight, change the features of the implant in a number of aspects. The flank angle of the threading has changed from 30 to 40 degrees. This implies that the depth of the threading is reduced, leaving more material to the implant body. In figures the depth of the macrothreading has changed from 0.37 mm to 0.30 mm, increasing the wall thickness on Fixture MicroThread 3.5 by 18%.

Guided by success

Our guiding principle in designing the new implant has been the much appreciated installation properties of the Fixture TiOblast. Its predictable properties in terms of insertion torque and tactile perception give a secure installation and a distinct indication when the implant is in place. The design of the microthreaded portion of the Fixture MicroThread has been tailored to compress the cortical bone tissue slightly in radial directions, resulting in a distinct increase of the torque needed for screwing the implant. The microthreaded surface will increase the friction between cortical bone and implant when the marginal part of the implant is screwed into the fixture site. This compression of bone tissue is reduced compared to a smooth implant surface.

Low level compression

Cortical bone is hard enough to provide a perceptible change in screwing torque, even when it is only slightly compressed. The compression however must be limited, since it is known that the cortical bone is sensitive to high compression and might be damaged by it. Thus, the compres-



sion used should be such that a distinct increase of the screwing torque is achieved while the compression of cortical tissue is held within acceptable levels. The rise in torque is useful as an indication of the implant being in place if it appears towards the final stage of the insertion procedure, when the marginal portion of the implant is engaging the cortical bone.

Good primary stability

The new Fixture MicroThread has a unique combination of micro- and macrothreading and an increased stiffness that provides excellent primary stability. The retention elements at the neck engage more bone in support of the implant.

High initial insertion torque does not necessarily lead to better primary stability. A high torque value late in the installation phase, however, indicates the achievement of good primary stability. High torque values obtained early in the installation phase may generate heating or compression beyond biological limits.

Primary stability is entirely a mechanical function – referring to the bone quality and quantity, the design of the implant and the preparation technique. ■

ASTRA TECH IMPLANTS
DENTAL SYSTEM

Introducing Fixture MicroThread™

Taking technology to the top

A high and maintained marginal bone level not only ensures secure anchoring of the implant, but also promotes and supports healthy soft tissues. Fixture MicroThread therefore preserves the integrity of both hard and soft tissues, fundamental for long-lasting esthetics.

With Fixture MicroThread you do not have to compromise. For you, the dentist, a satisfied patient is the primary goal of dental implant treatment. To be satisfied, the patient demands a functional result and long-lasting esthetics.

The key to long-lasting optimal esthetics and functional outcome is maintenance of the marginal bone.

Do not accept bone loss!



Baseline X-ray
showing Fixture
MicroThread
in place.



X-ray at 5 years
follow-up showing
preservation of high
levels of marginal bone.



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.

Finland

Astra Tech Oy, PL 96, FI-022301 Espoo.
Tel: +358 9 8676 1626. Fax: +358 9 8044 128.

France

Groupe Pharmaceutique AstraZeneca,
7, rue E & A Peugeot, FR-92500 Rueil-Malmaison Cedex.
Tel.: +33 1 41 39 02 40. Fax: +33 1 41 39 02 44.

Germany

Astra Tech GmbH, An der kleinen Seite 8, DE-65604 Elz.
Tel: +49 6431 9869 0. Fax: +49 6431 9869 500.

Italy

Astra Tech S.p.A.
Via M. Luther King n. 38/2, IT-40132 Bologna
Tel: +39 051 641 6511. Fax: +39 051 641 7742.

The Netherlands

Astra Tech BV, Signaalrood 55, NL-2718 SG Zoetermeer.
Tel: +31 79 360 1950. Fax: +31 79 362 3748.

Norway

Astra Tech AS, Postboks 160, NO-1471 Lørenskog.
Tel: +47 67 92 05 50. Fax: +47 67 92 05 60.

Spain

Astra Tech S.A.,
Calle Ciencias nº 73 derecha. Nave 9, 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.

United Kingdom

Astra Tech Ltd., Brunel Way, Stonehouse, Glos GL10 3SX.
Tel: +44 1453 791763. Fax: +44 1453 791001.

USA

Astra Tech Inc.
430 Bedford Street, Suite 100, Lexington, MA 02420.
Tel: +1 781 861 7707. Fax: +1 781 861 7787.

Japan

Astra Tech Division, AstraZeneca K.K.
Tokyo Regional Office
Koraku Mori Bldg. 11F, 1-4-14, Koraku
Bunkyo-ku, Tokyo 112-0004.
Tel: +81 3 5840 1113. Fax: +81 3 5840 1160.

Other Markets

Astra Tech AB, Export Department,
P.O. Box 14, SE-431 21 Mölndal, Sweden.
Tel: +46 31 776 30 00. Fax: +46 31 776 30 23.



editor.insight@astratech.com



+46 31 776 30 12



**The Insight Editor
Astra Tech AB**

P.O. Box 14
SE-431 21 Mölndal, Sweden



A company in the
AstraZeneca Group

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