

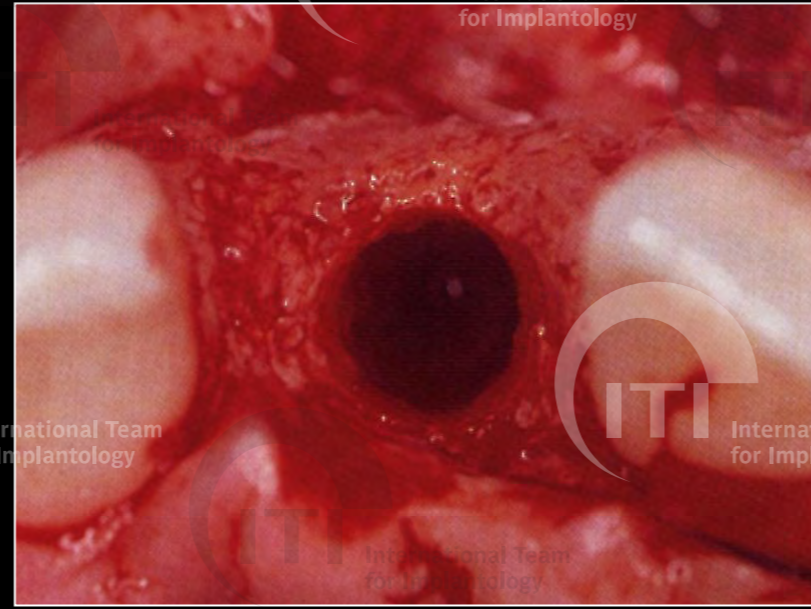
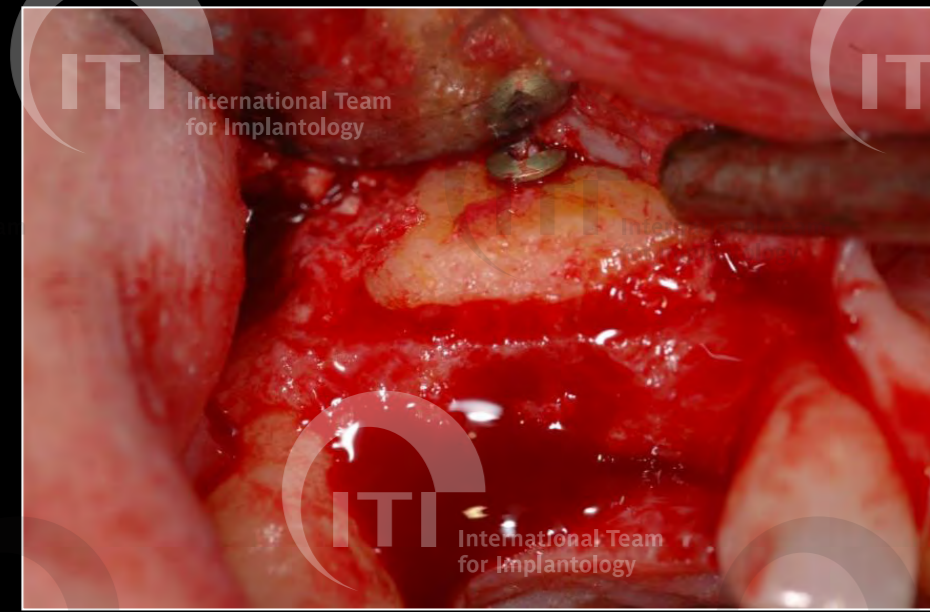
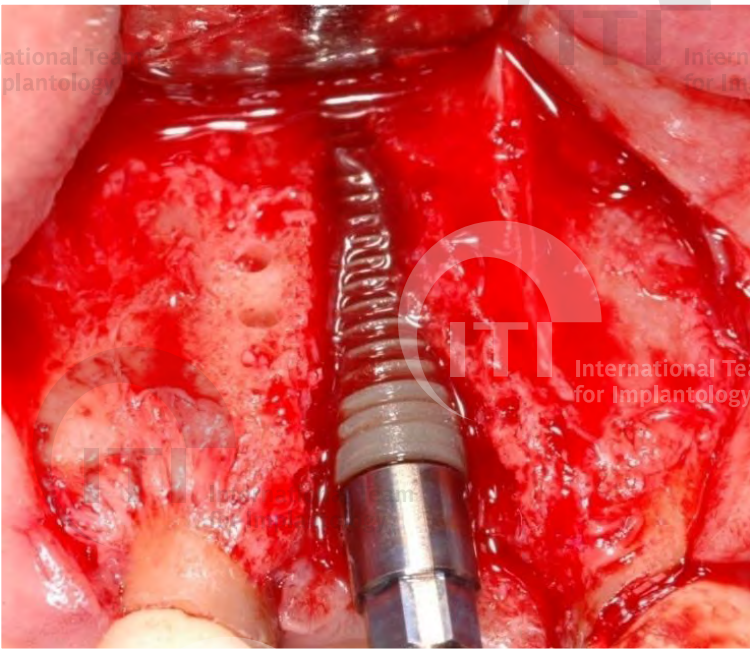


30 Years of
Leadership and Credibility

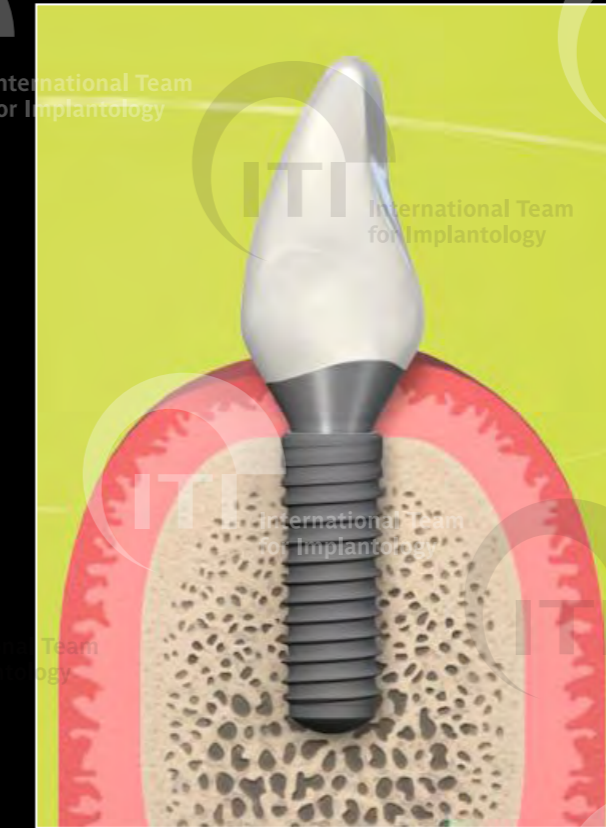
New narrow body implants:
Expanded treatment opportunities?

Paul Stone
Perth, Scotland

What Influences your choice of implant diameter?

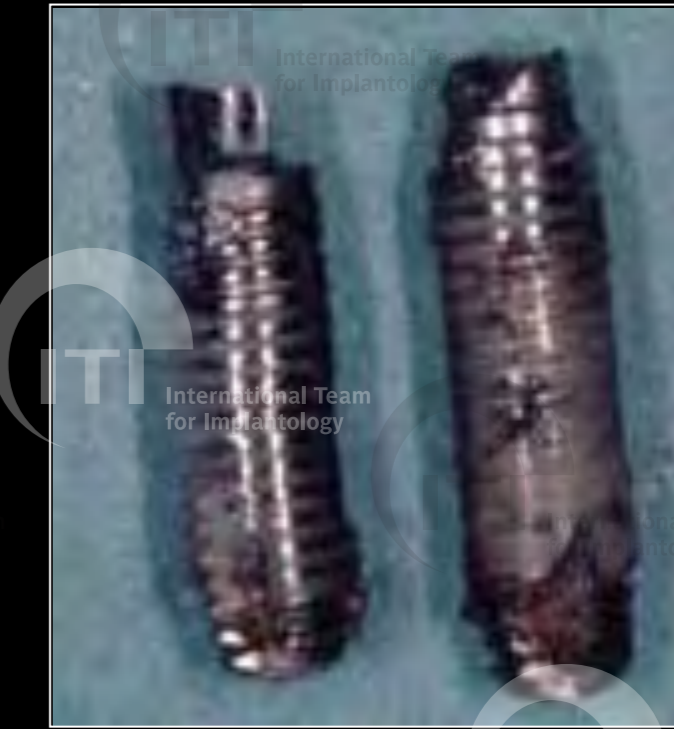


Restorative platform

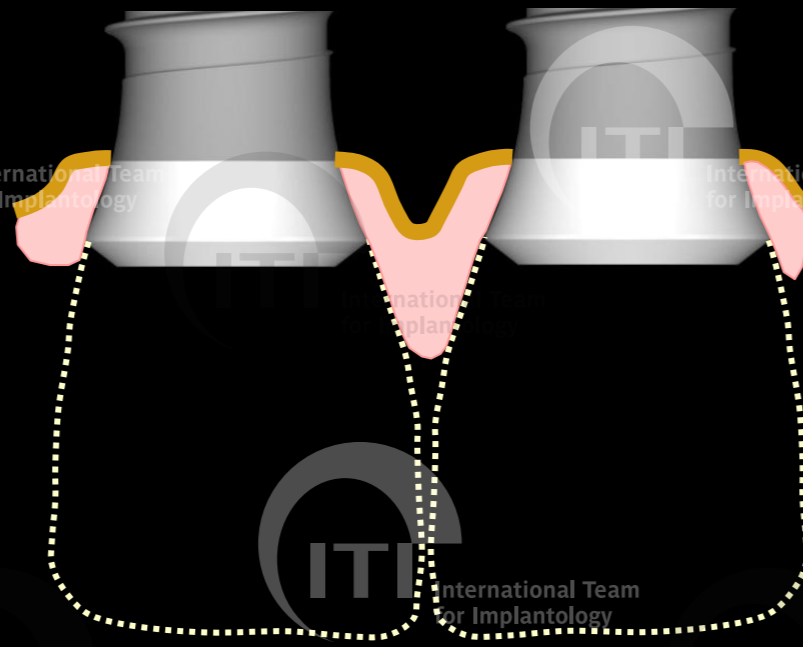
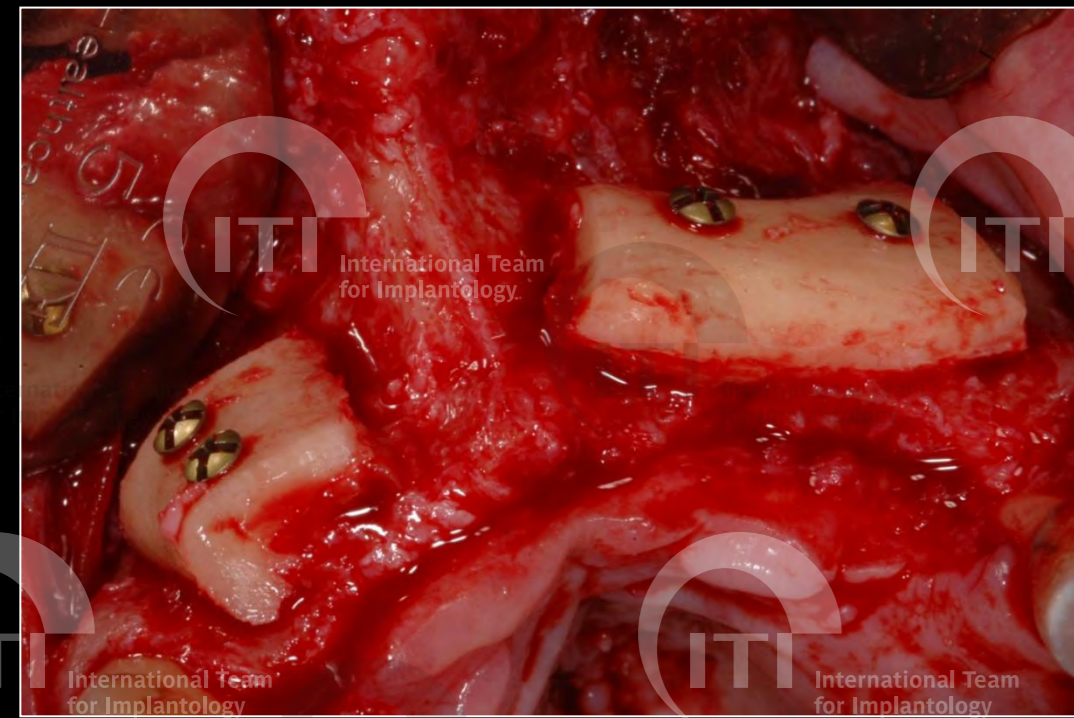


Surgical considerations

Biological factors



Physical Properties



Definitions:



“Wide”: **>4.5mm**

94.2% survival

Mean failure time: 6.4 months

2514 implants over a 5 year period

Shatkin T et al 2007

“Standard”: **3.6–4.5mm**

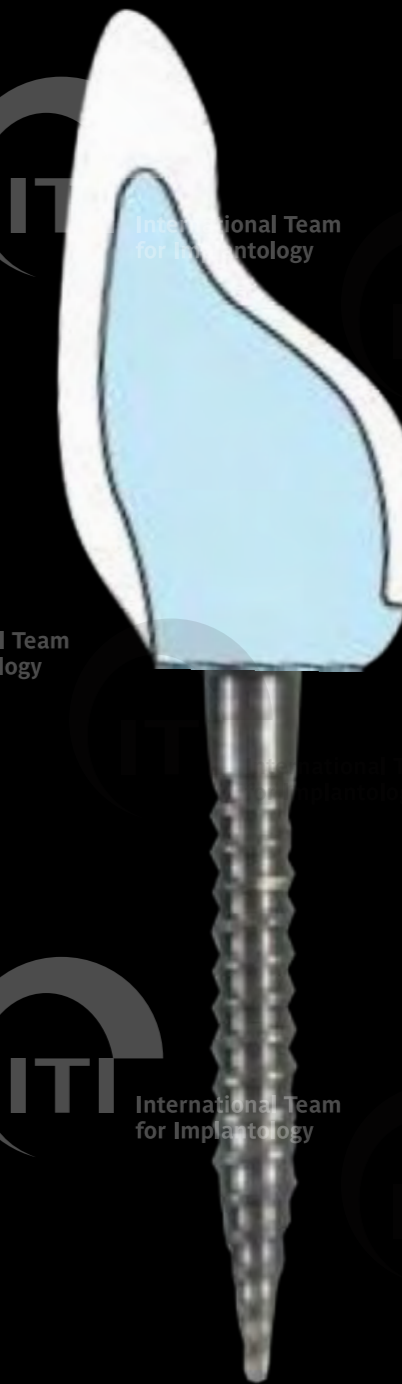
91.7% survival

1029 implants from 5 month to 8 year period

Bulard RA 2005

“Narrow”: **2.5–3.5mm**

“Mini”implants” <2.5mm





Implant Material

Mechanical properties

Biocompatibility

Surface chemistry and structure

Influences treatment outcomes

Currently available implant materials:

Titanium (Ti):

Less strength, good osseointegration

Ti-alloys (Ti-6Al-4V):

Higher strength

Less favorable osseointegration

Zirconium (Zr):

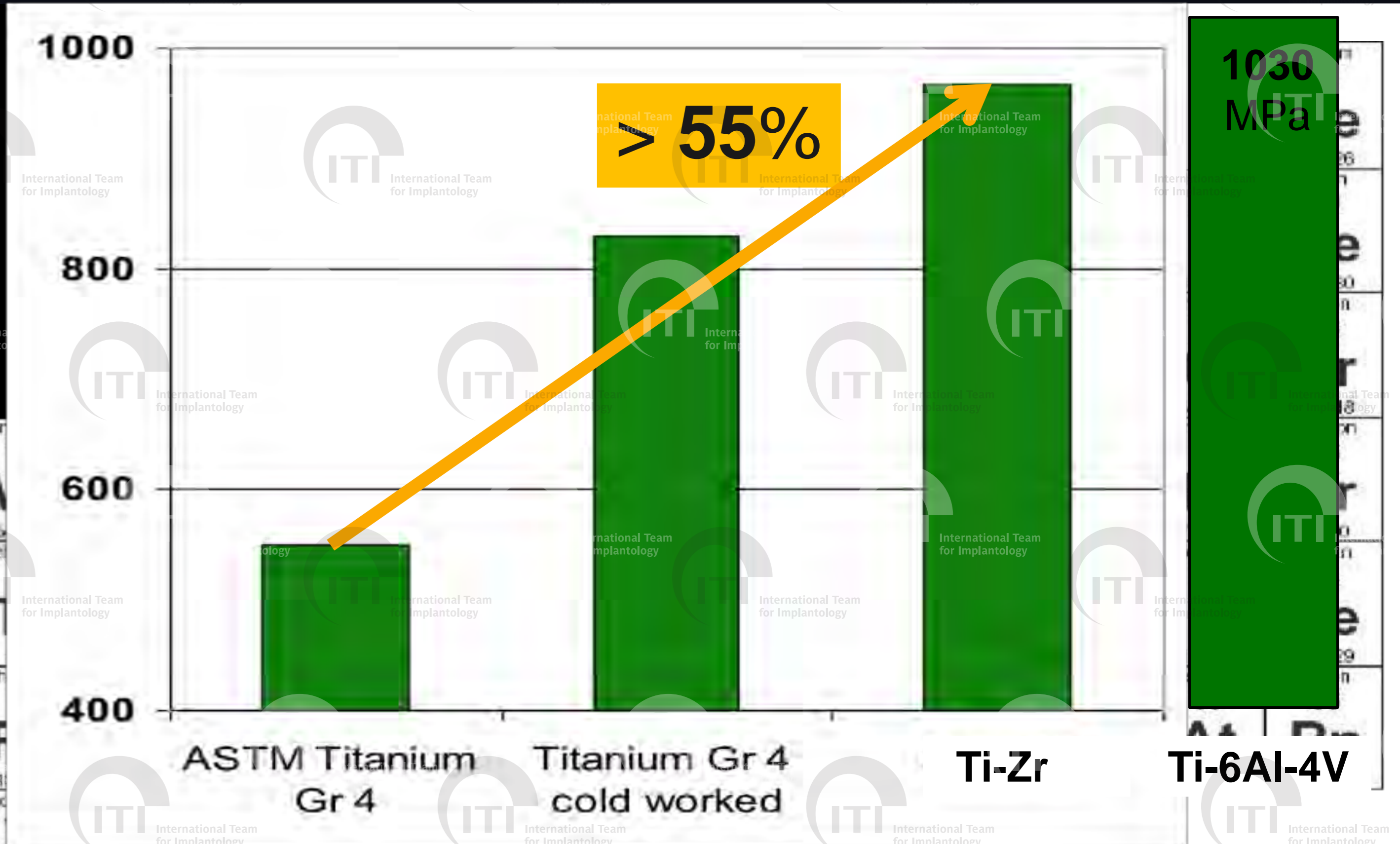
Few studies, preparation problems

Innovative Alloy (Ti-Zr):

Titanium and Zirconium

hydrogen 1 H 1.00794	helium 2 He 4.002602																
lithium 3 Li 6.941	beryllium 4 Be 9.0122																
sodium 11 Na 22.990	magnesium 12 Mg 24.305																
potassium 19 K 39.098	calcium 20 Ca 40.078	scandium 21 Sc 44.956	titanium 22 Ti 47.867	vanadium 23 V 50.942	chromium 24 Cr 51.996												
rubidium 37 Rb 85.468	strontium 38 Sr 87.62	yttrium 39 Y 88.906	zirconium 40 Zr 91.224	niobium 41 Nb 92.906	molybdenum 42 Mo 95.94												
caesium 55 Cs 132.91	barium 56 Ba 137.33	lanthanum 57-70 * Lu 174.97	hafnium 72 Hf 178.49	tantalum 73 Ta 180.95	tungsten 74 W 183.84												
francium 87 Fr [223]	radium 88 Ra [226]	actinides 89-102 * * Lr [262]	rutherfordium 104 Rf [261]	dubnium 105 Db [262]	seaborgium 106 Sg [266]												

Tensile strength (MPa)



Calculated from minimal strength properties of TiZr (according to internal specifications) and Ti(Gr4) (according to ASTM F67)

Competitor Comparison: ultimate fatigue strength

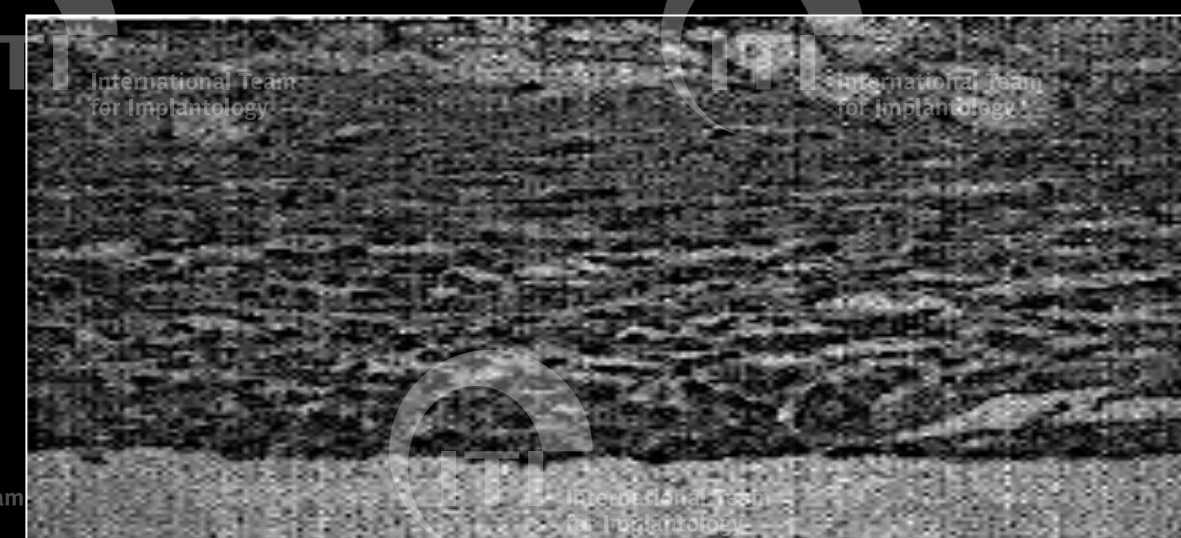
Ti-Zr: abutment #
All others: implant #



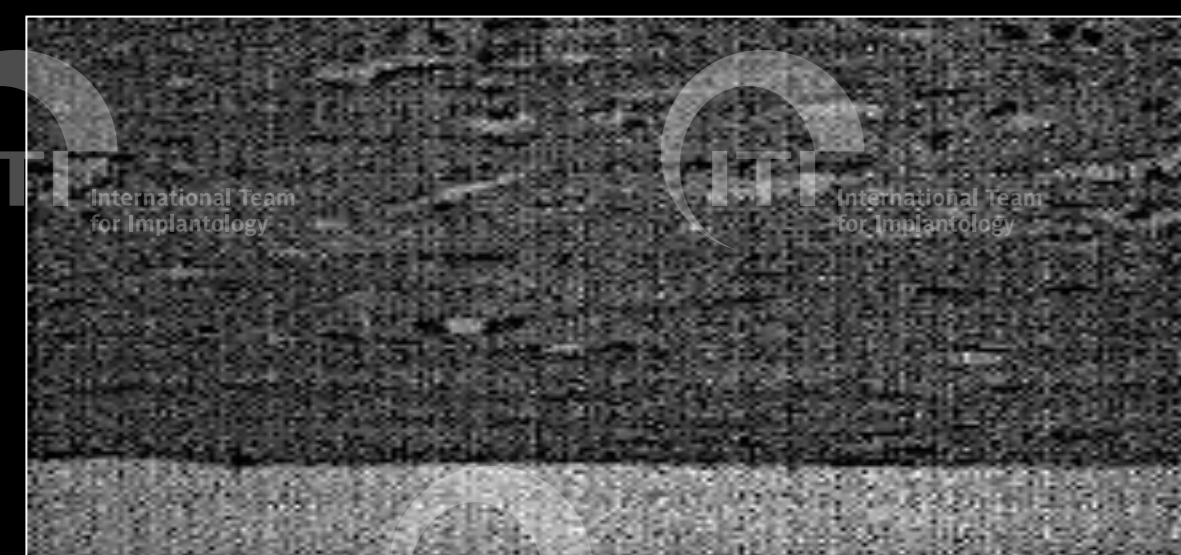
Implant materials - biocompatibility:

Ikarashi Y et al. 2005

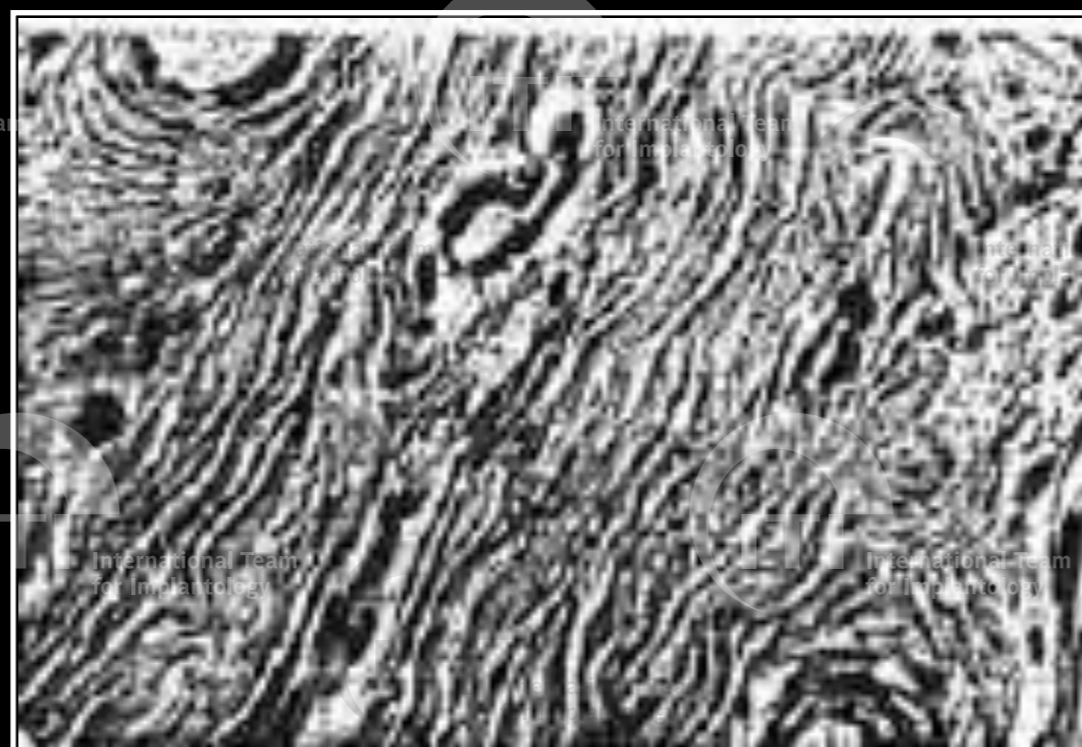
- Ti and Ti-Zr implants - 8 months in rats
- Lower **inflammatory** response of Ti-Zr



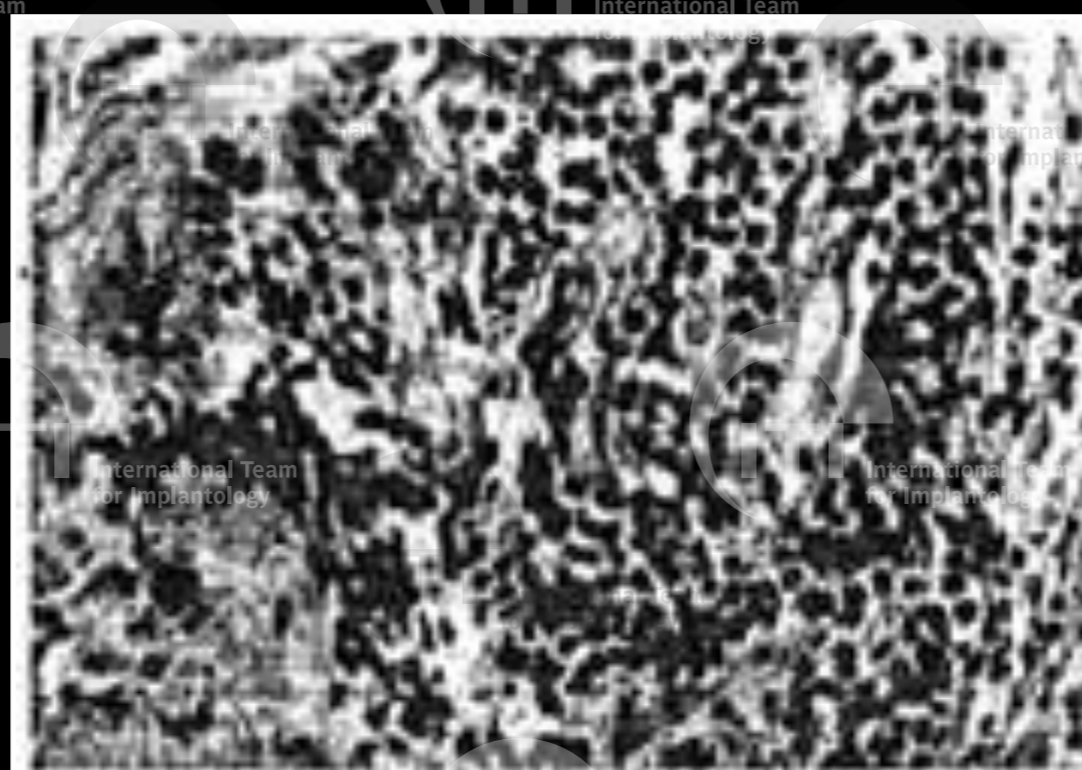
Ti Gr4



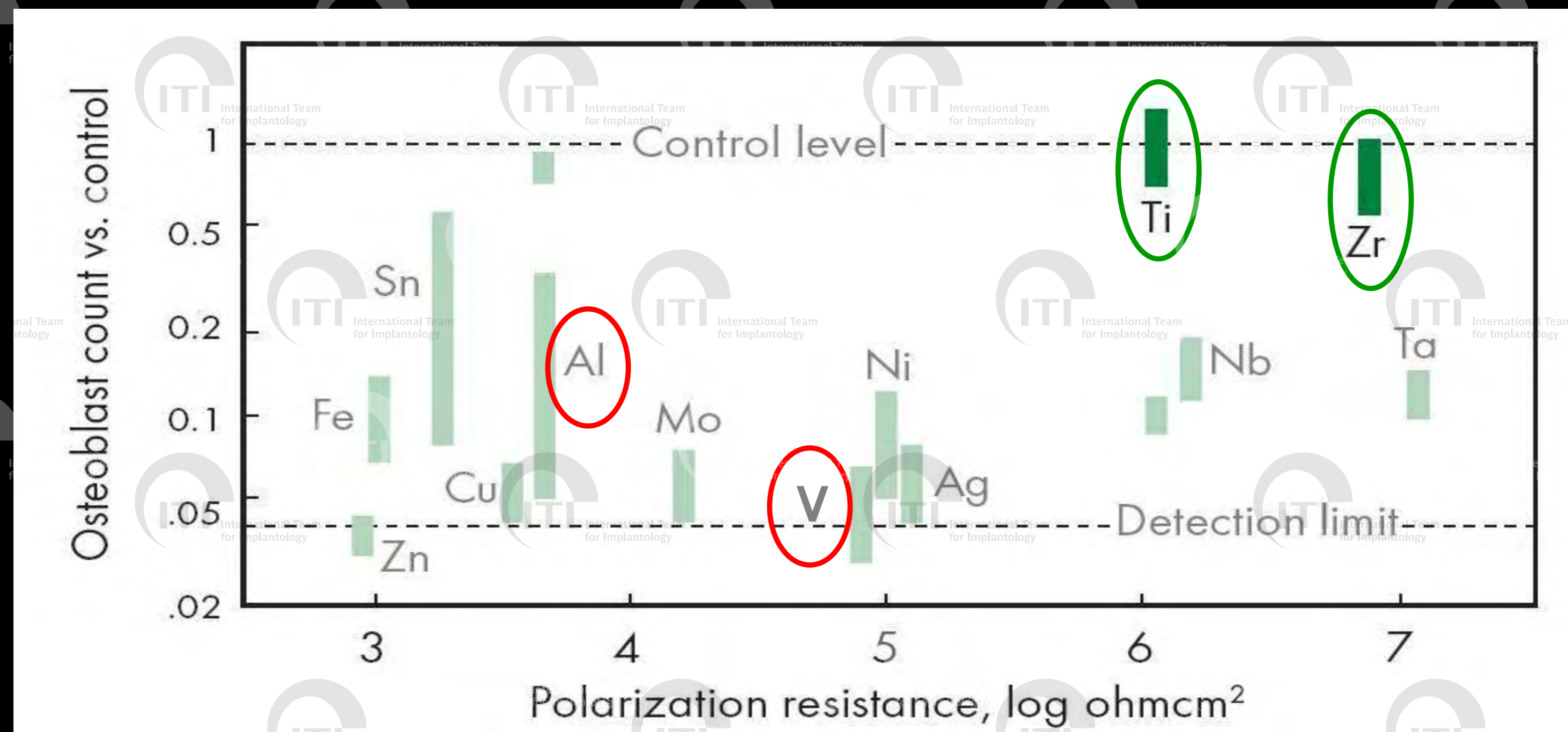
Ti-Zr



Ti Gr4



Ti-6Al4V

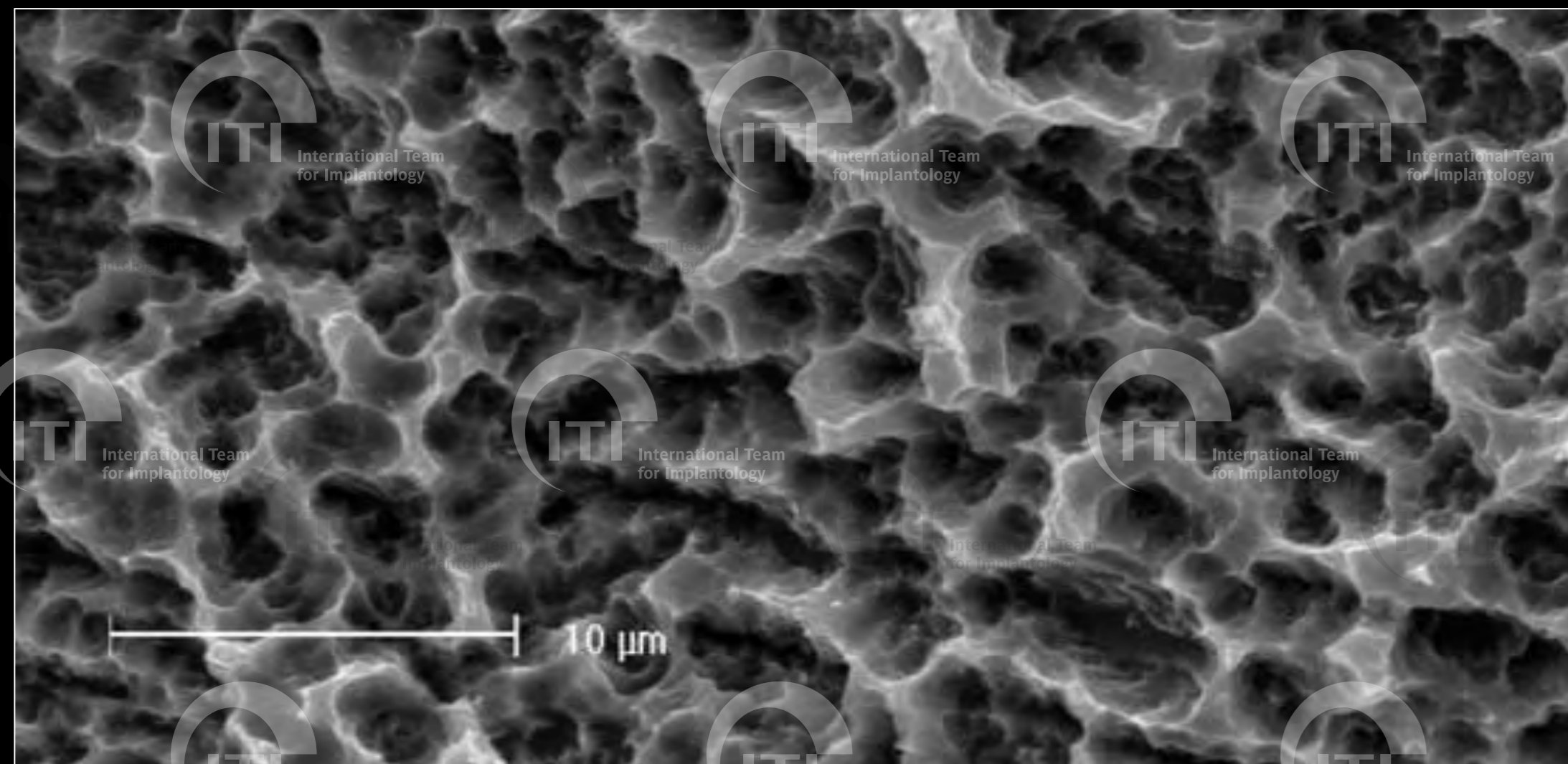


Steinemann S.G. 'Titanium – the material of choice?'

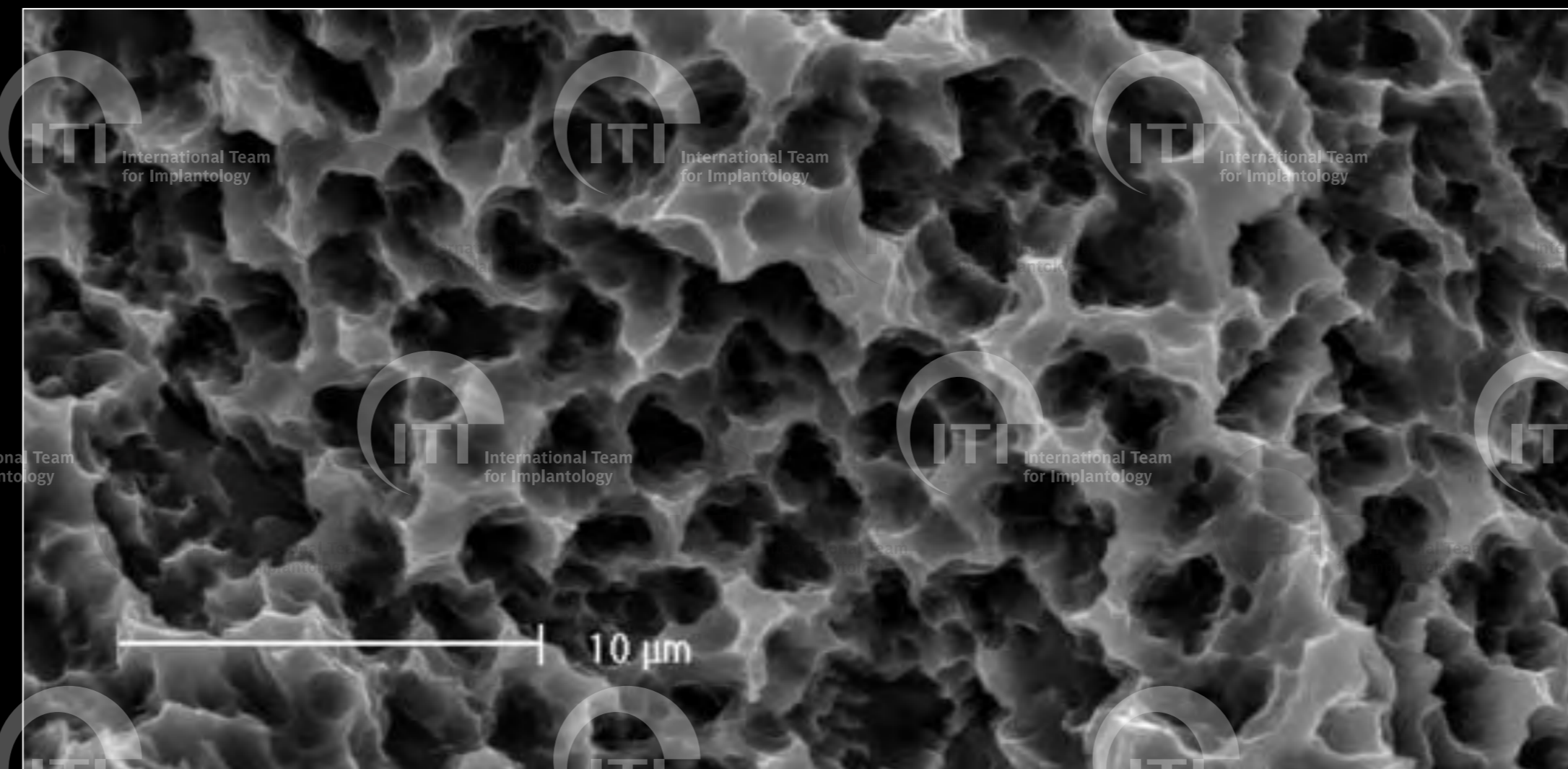
Periodontology 2000, Vol. 17, 1998, 7-21

SLActive[®] surface treatments:

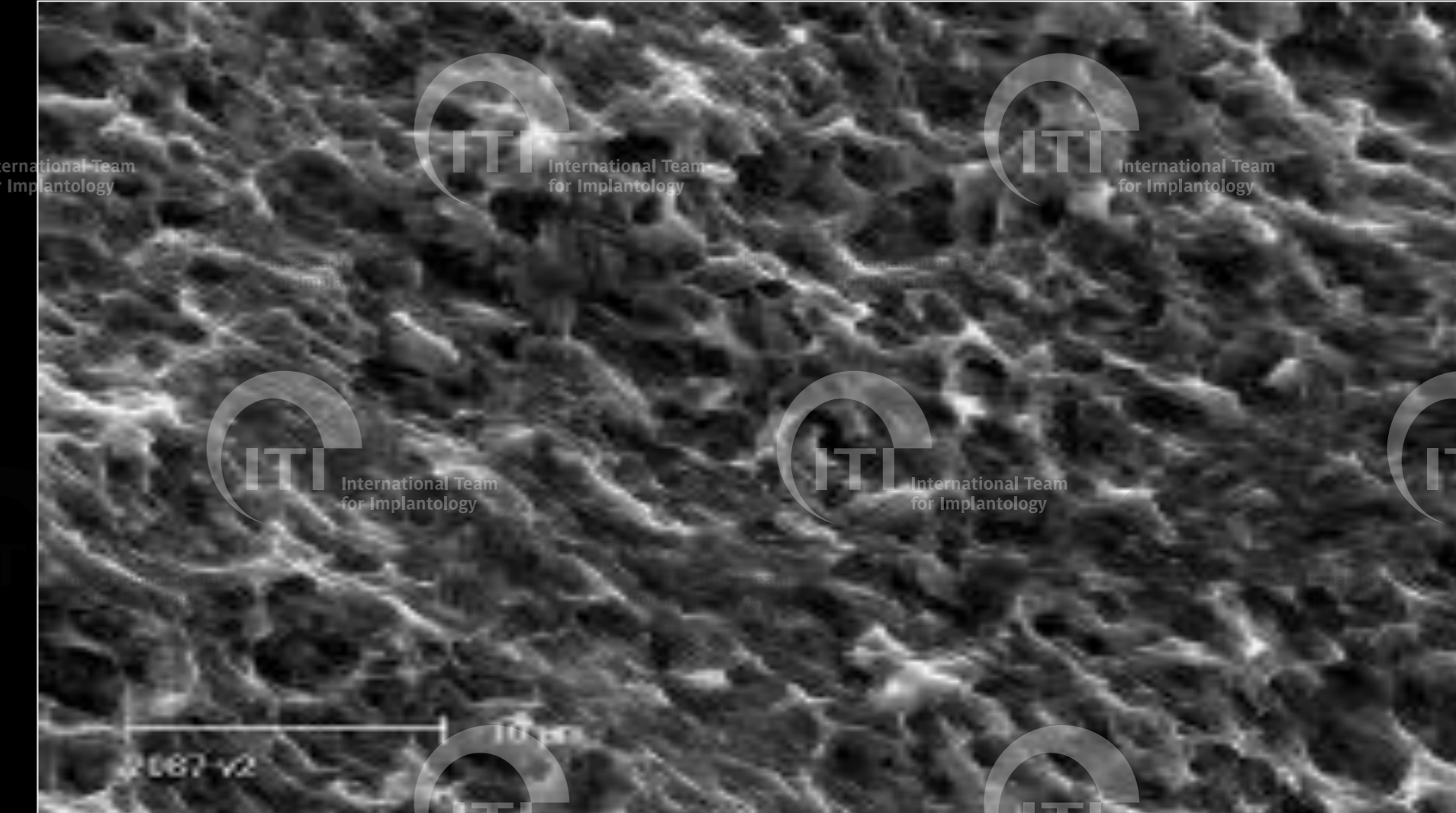
monophasic structure – required for etching



Ti Gr4 Sandblasted and acid-etched



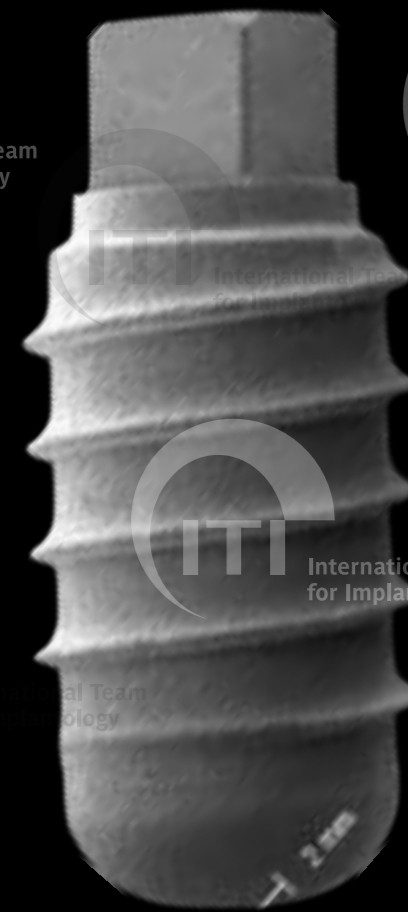
Ti-Zr Sandblasted and acid-etched



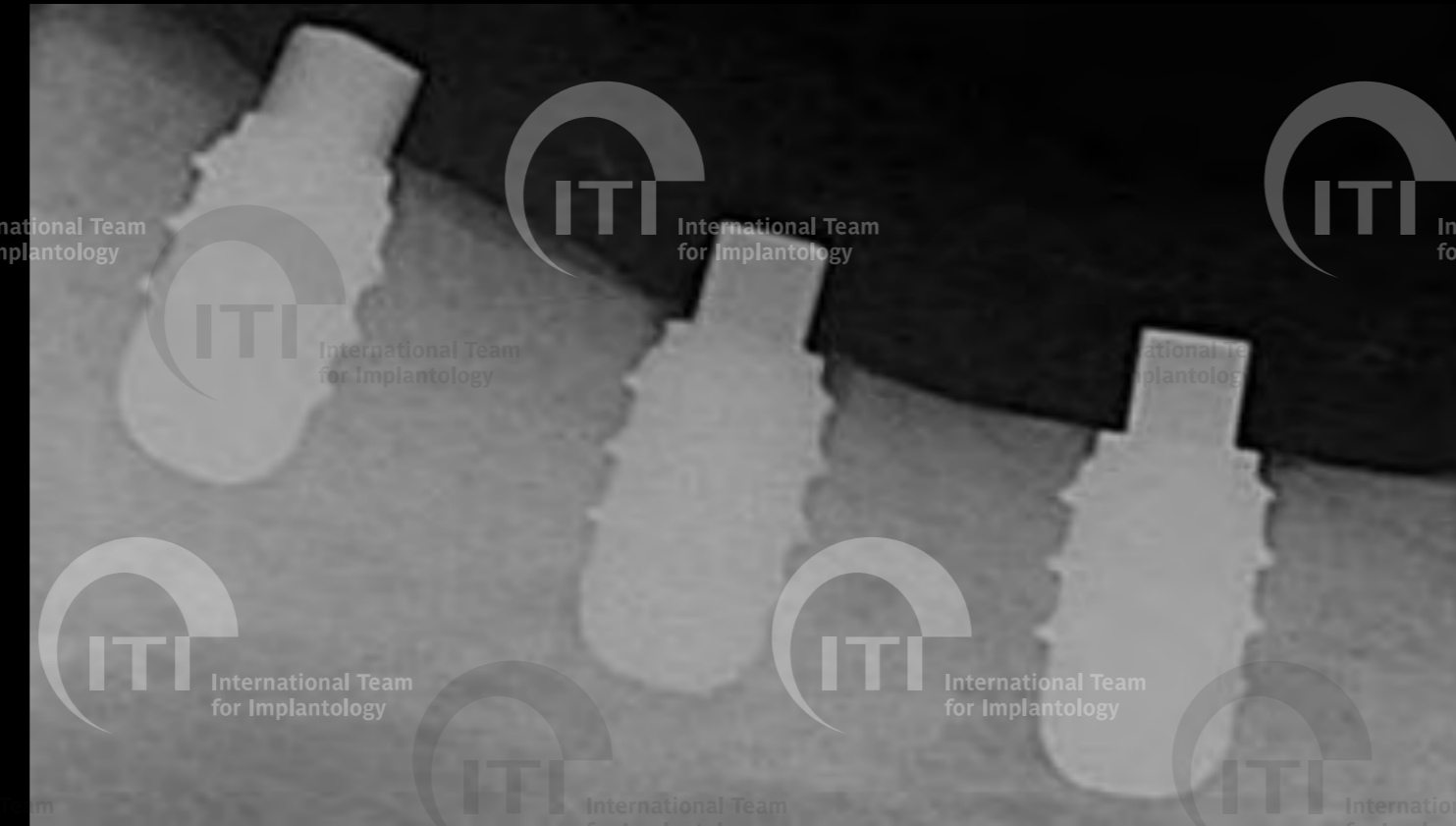
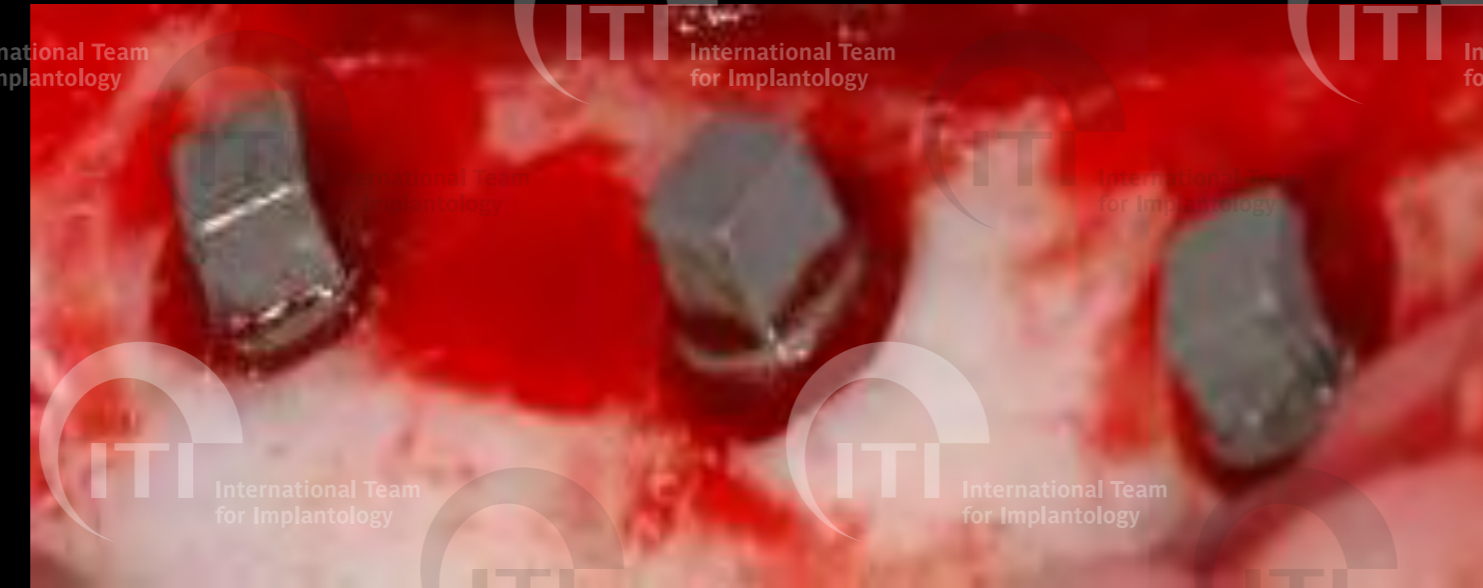
Ti-6Al-4V Sandblasted and acid-etched

Biomechanical and Histological evaluation

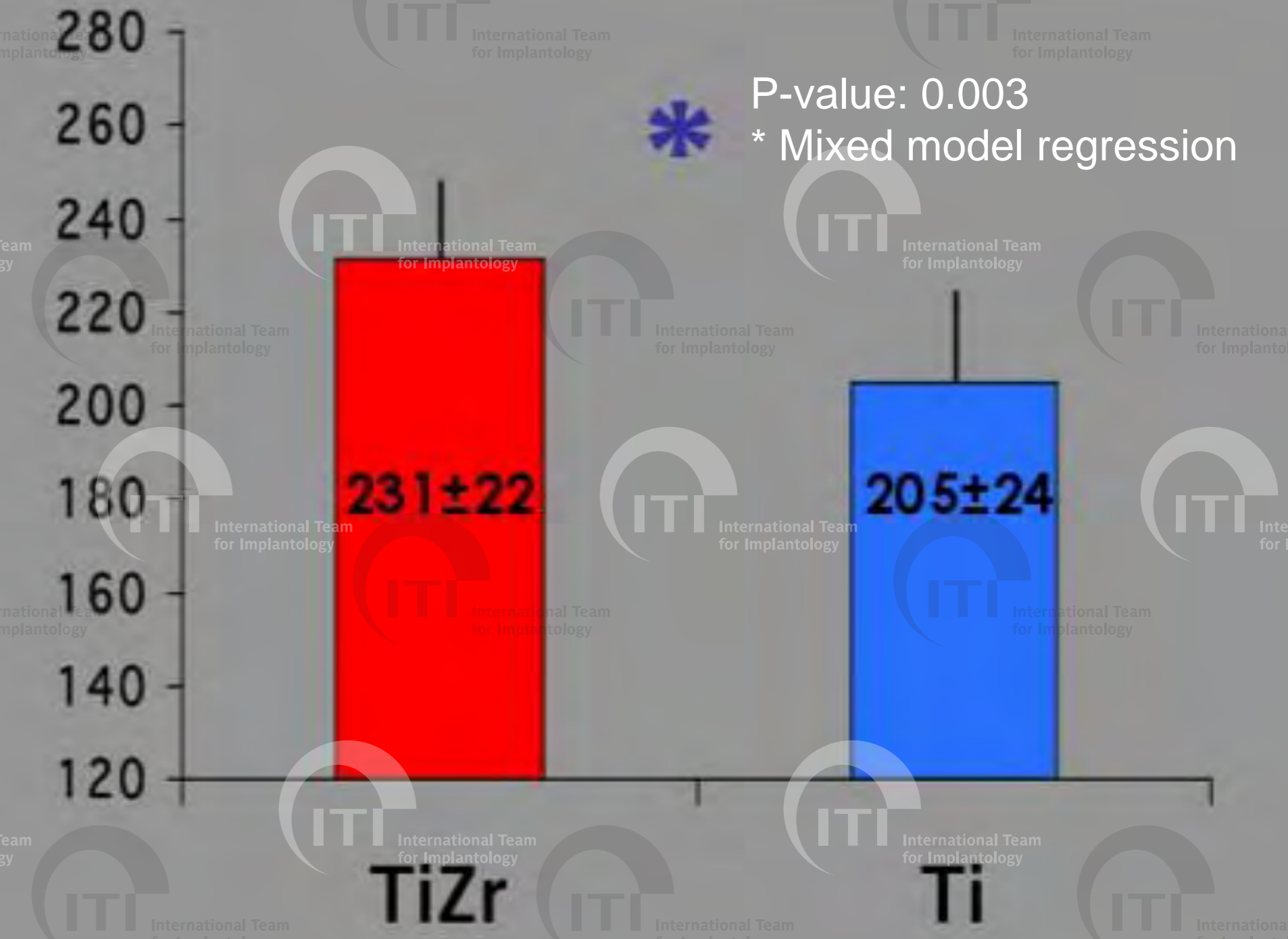
Biomechanical:



Ti-Zr SLActive
Ti SLActive



Removal torque (Ncm)

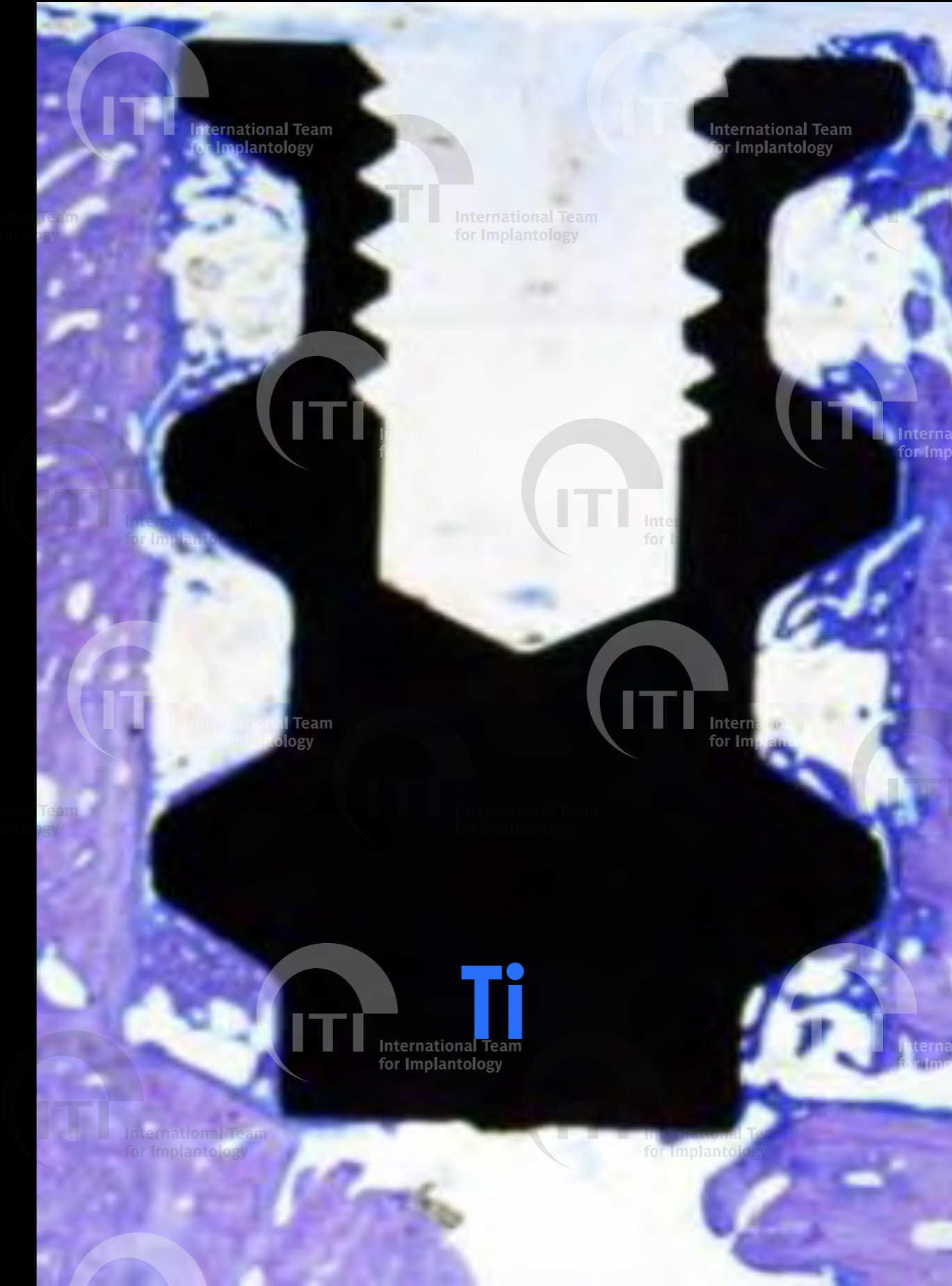
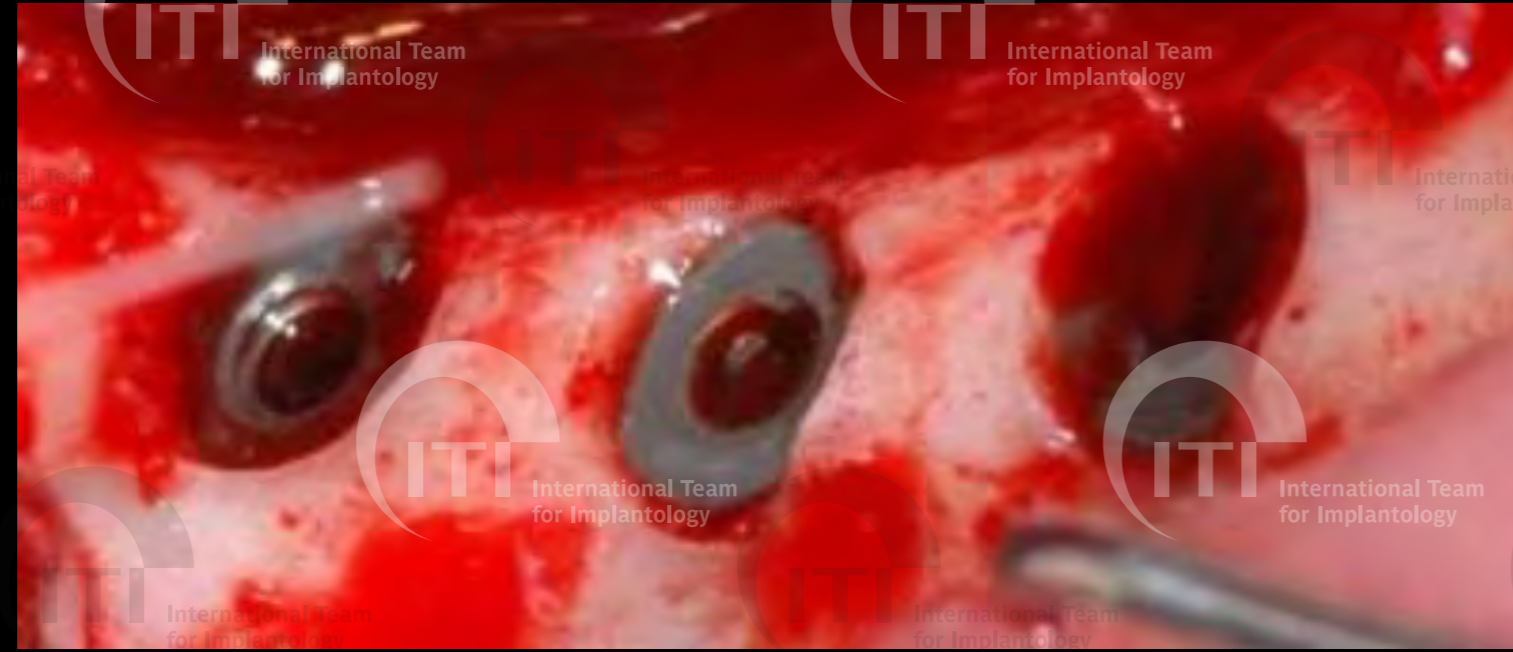


Biomechanical and Histological evaluation

Histological:



Ti-Zr SLActive
Ti SLActive



same BIC >70%
(bone to implant contact)

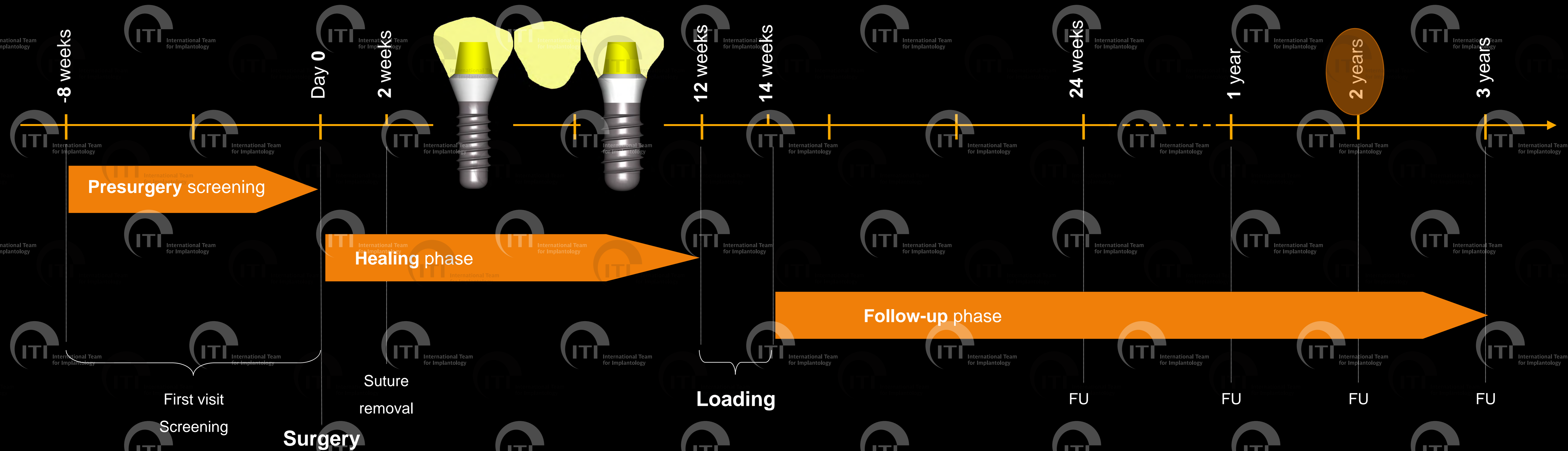
↑ bone ingrowth

Roxolid™	45.5±13.2%
Titanium	40.2 ±15.2%
P-value	0.02

Implant materials: biomechanical qualities

	Pure titanium	Ti-Al-V	Ti-Zr
Strength	+	++	+++
Osseointegration	++	+	+++ (SLActive)

A human pilot study to evaluate Ti-Zr alloy 3.3mm Regular Neck SLActive Implants

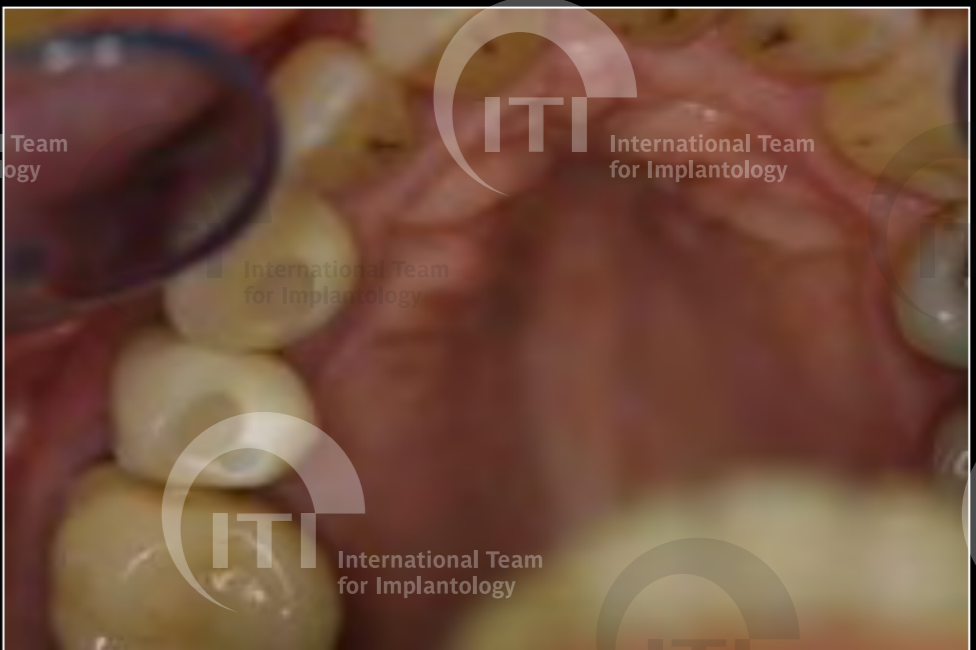
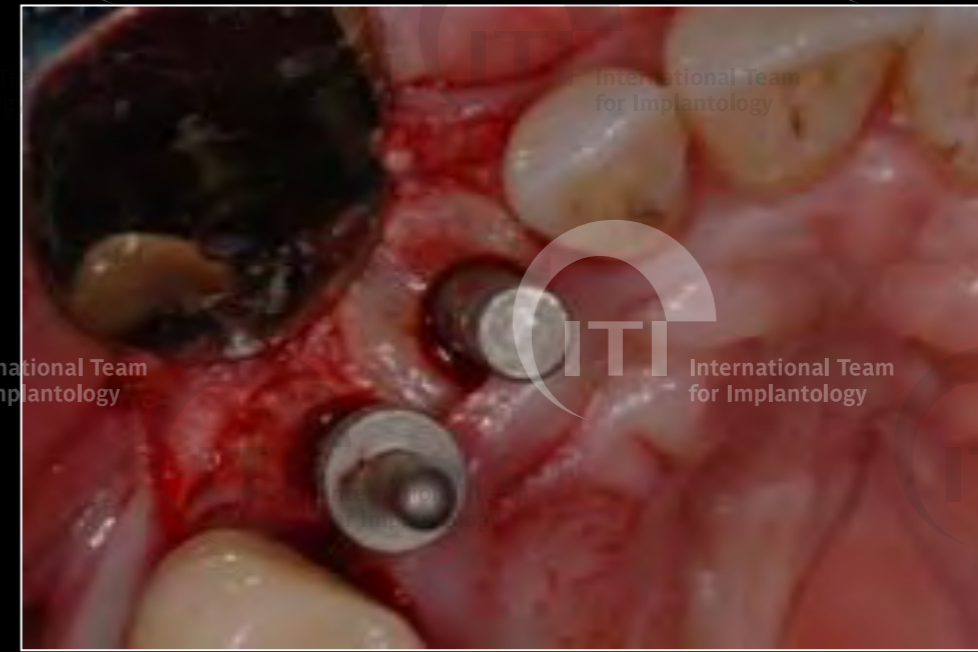


S. Barter & P. Stone (UK)

0208CG

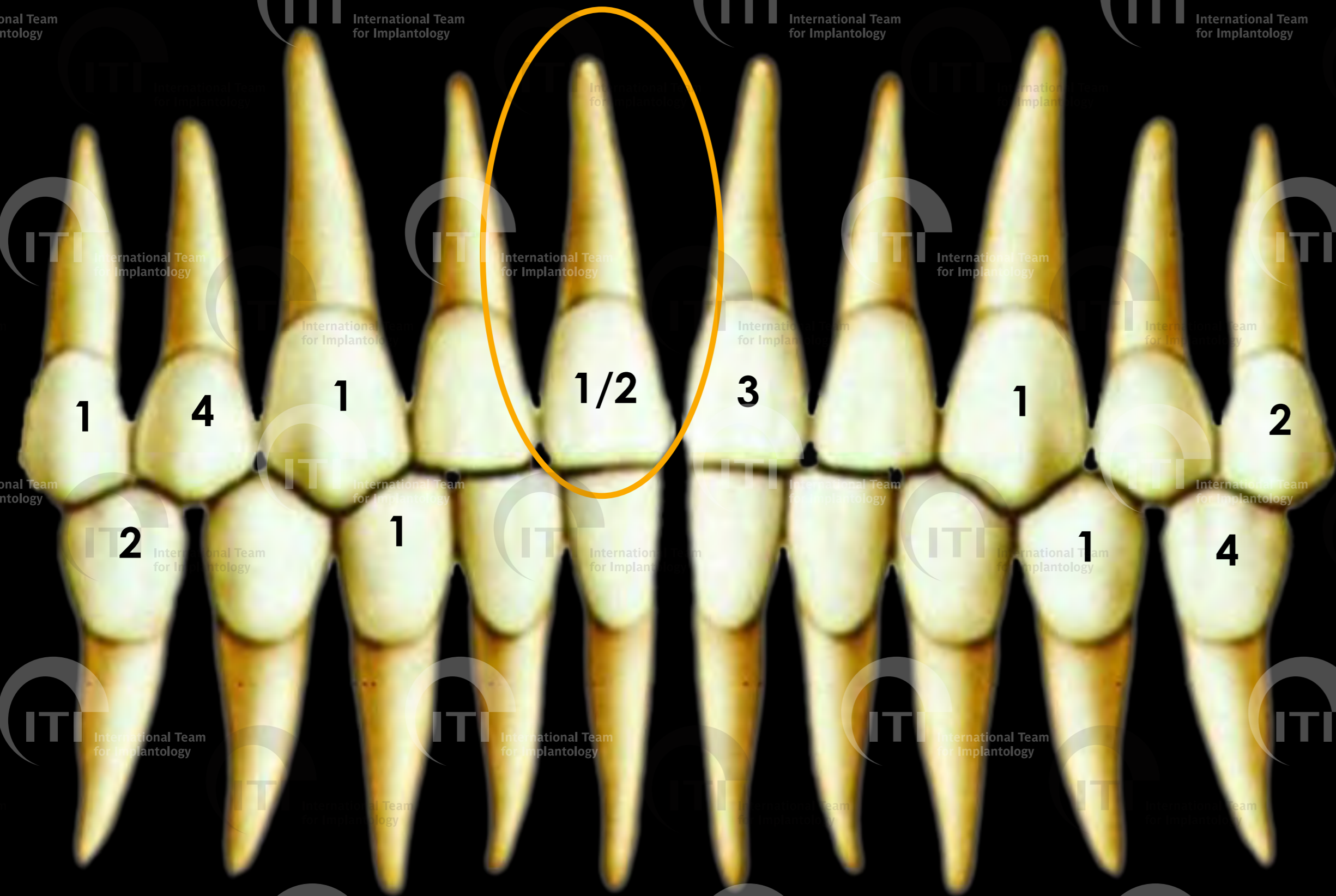
0214DH

0205CM

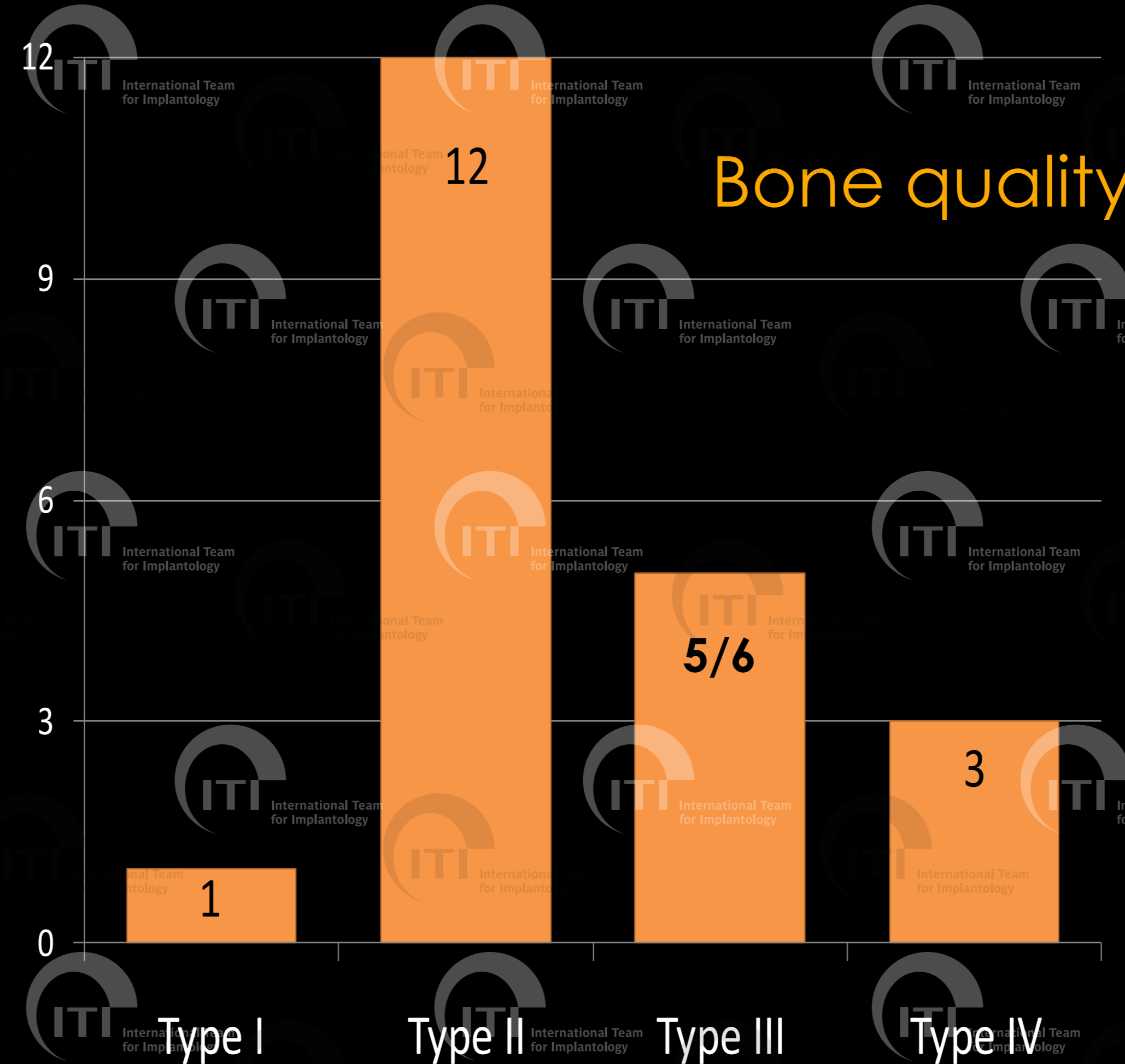


Patient	0101MMC	0102SCC	0103AC	0104NDP	0105RTC	0201JR	0202JEF	0203MG	0204EE
Pre-op									
Permanent restoration									
6 months									
12 months									

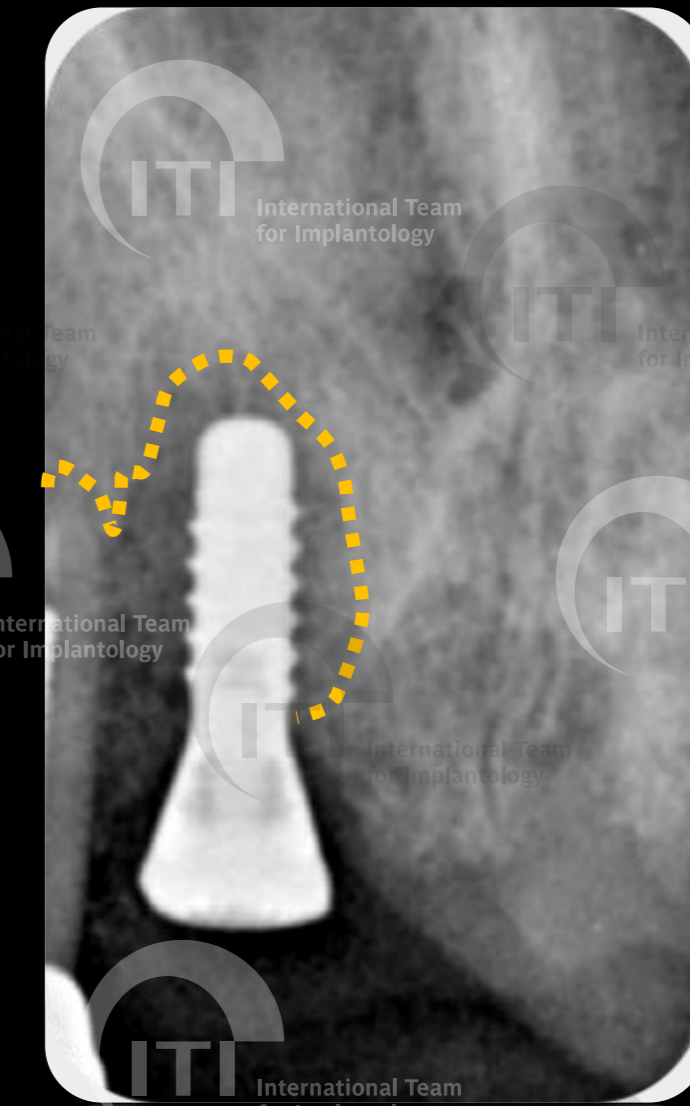
Survival rate after 2 years by implant position & bone quality



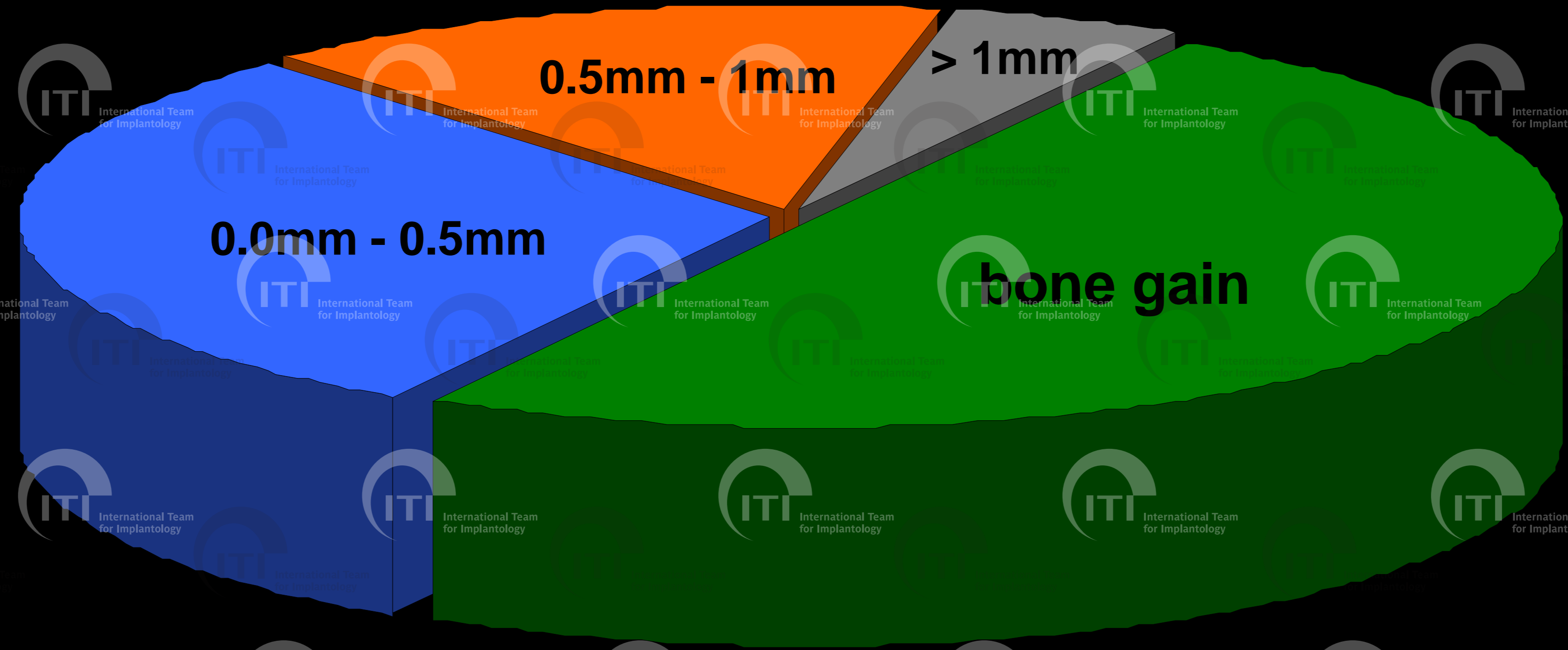
Status:
-22 patients recruited
-21 patients passed 2yr FU visit



Failed implant: case 2 - 10



Crestal bone changes after 1 year



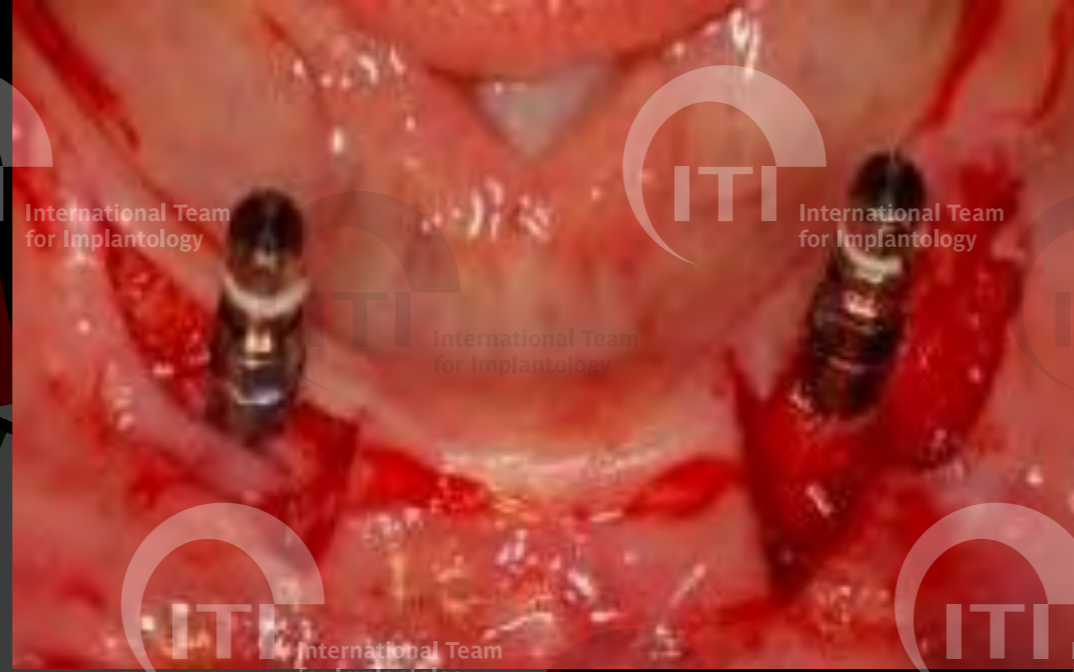
Multi center study in EU

- 5 countries, 8 centers

- 91 patients, 182 implants

- Double blind study (for 1 year)

- **No difference for:**
 - crestal bone loss
 - soft tissue bleeding
 - plaque accumulation



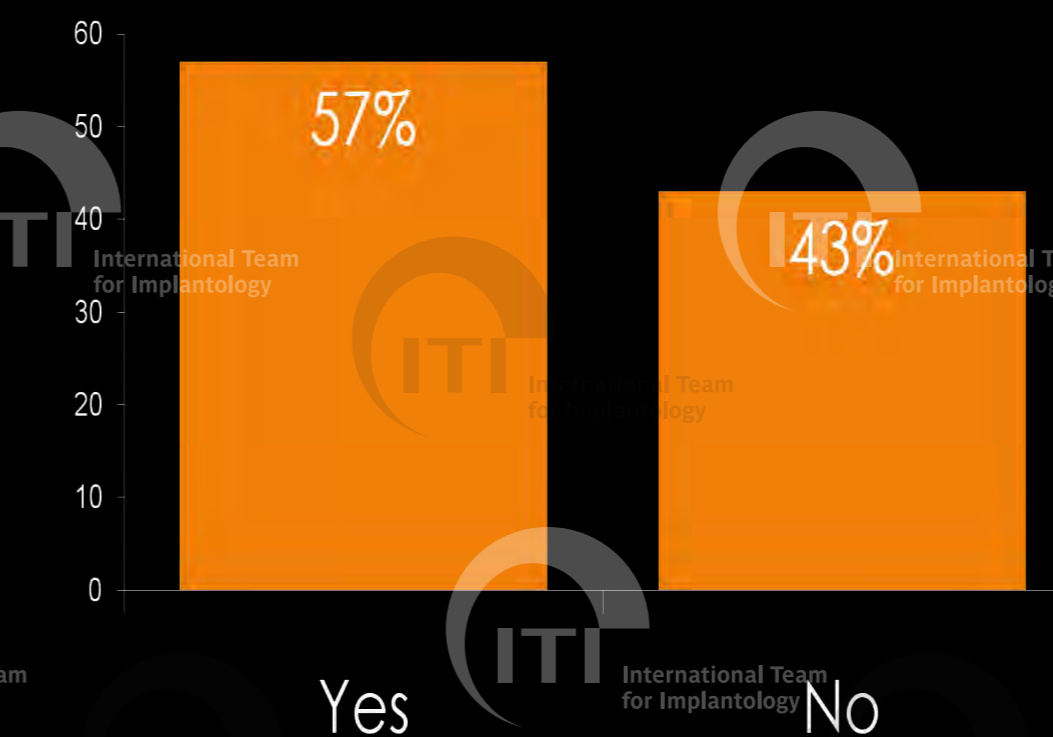
Non-Interventional Study (NIS)

- 7 countries, > 40 centers

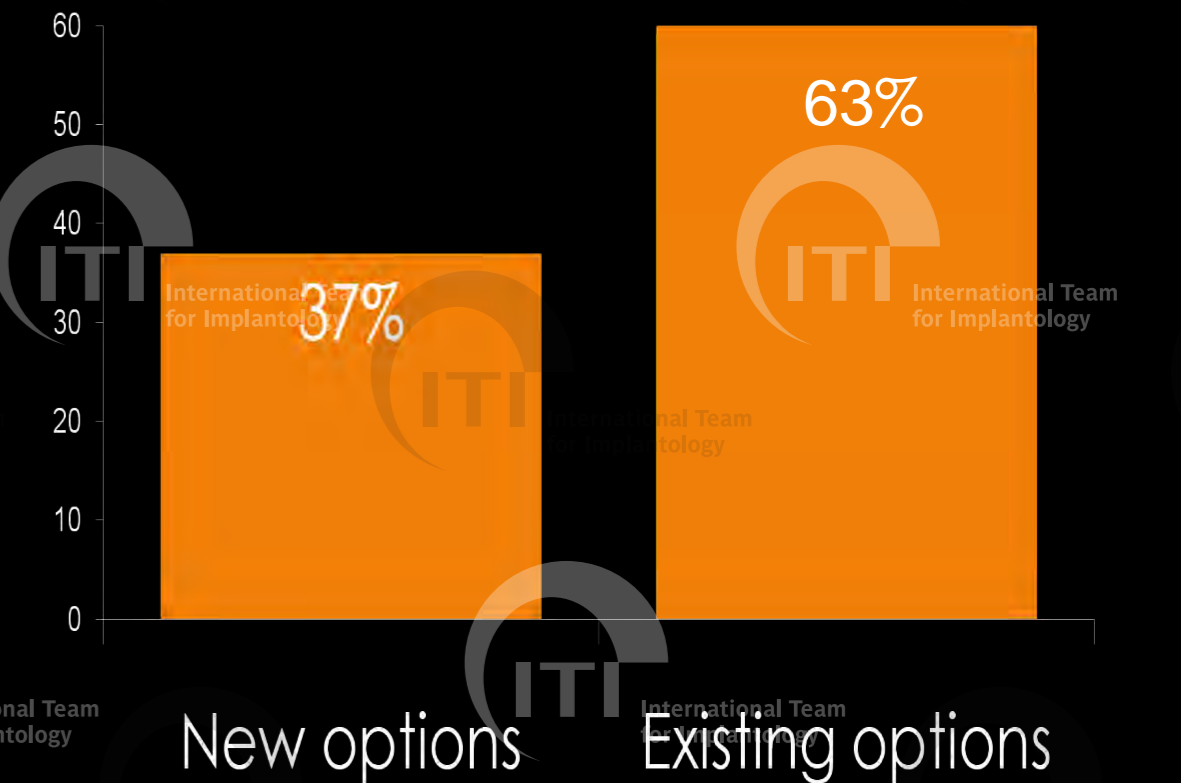
- 235 patients, 407 implants

- 2 failures = 99.5% success

Avoidance of graft by using 3.3mm Ti-Zr implant



New treatment options with Ti-Zr 3.3mm implants



Source: Al Nawas B, Small diameter implants – where advanced materials make the difference, presentation at the 18th Meeting of the European Association for Osseointegration (EAO), Monaco

Non-Interventional Study (NIS)

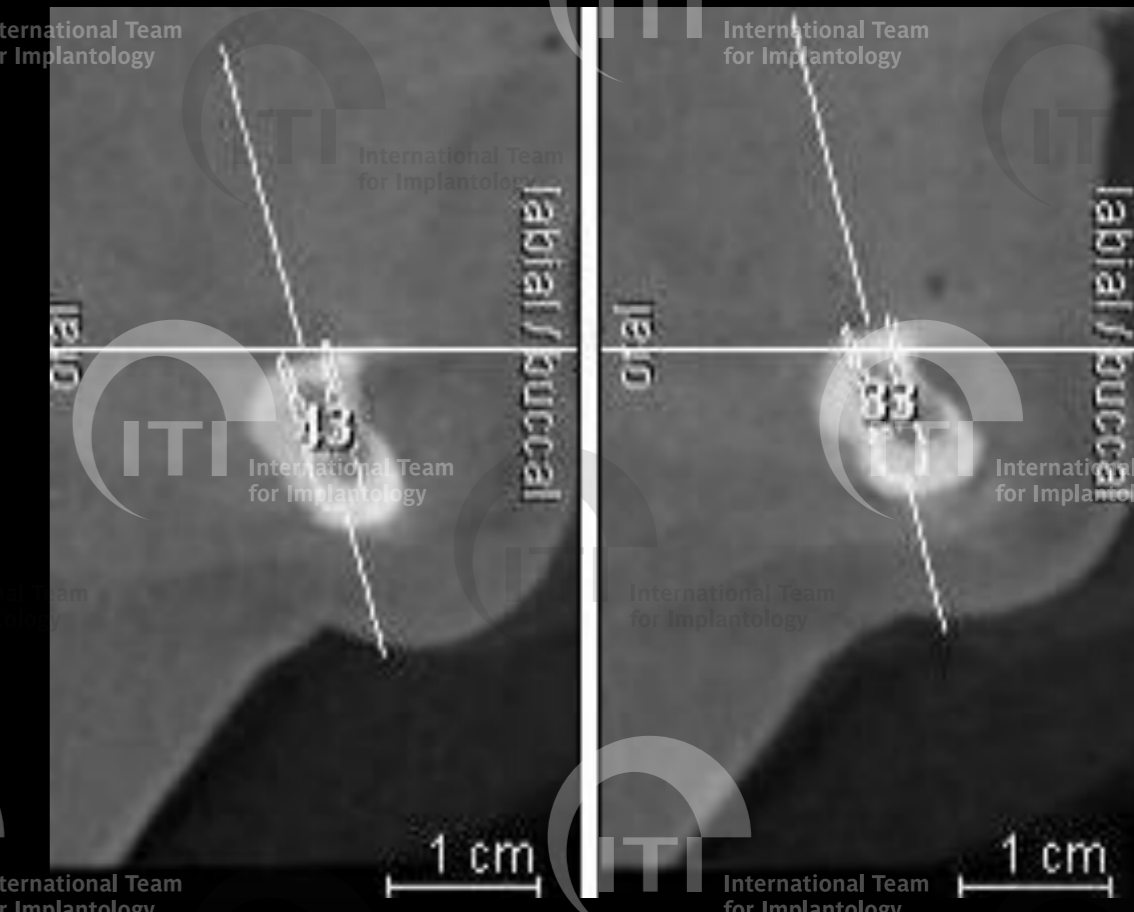
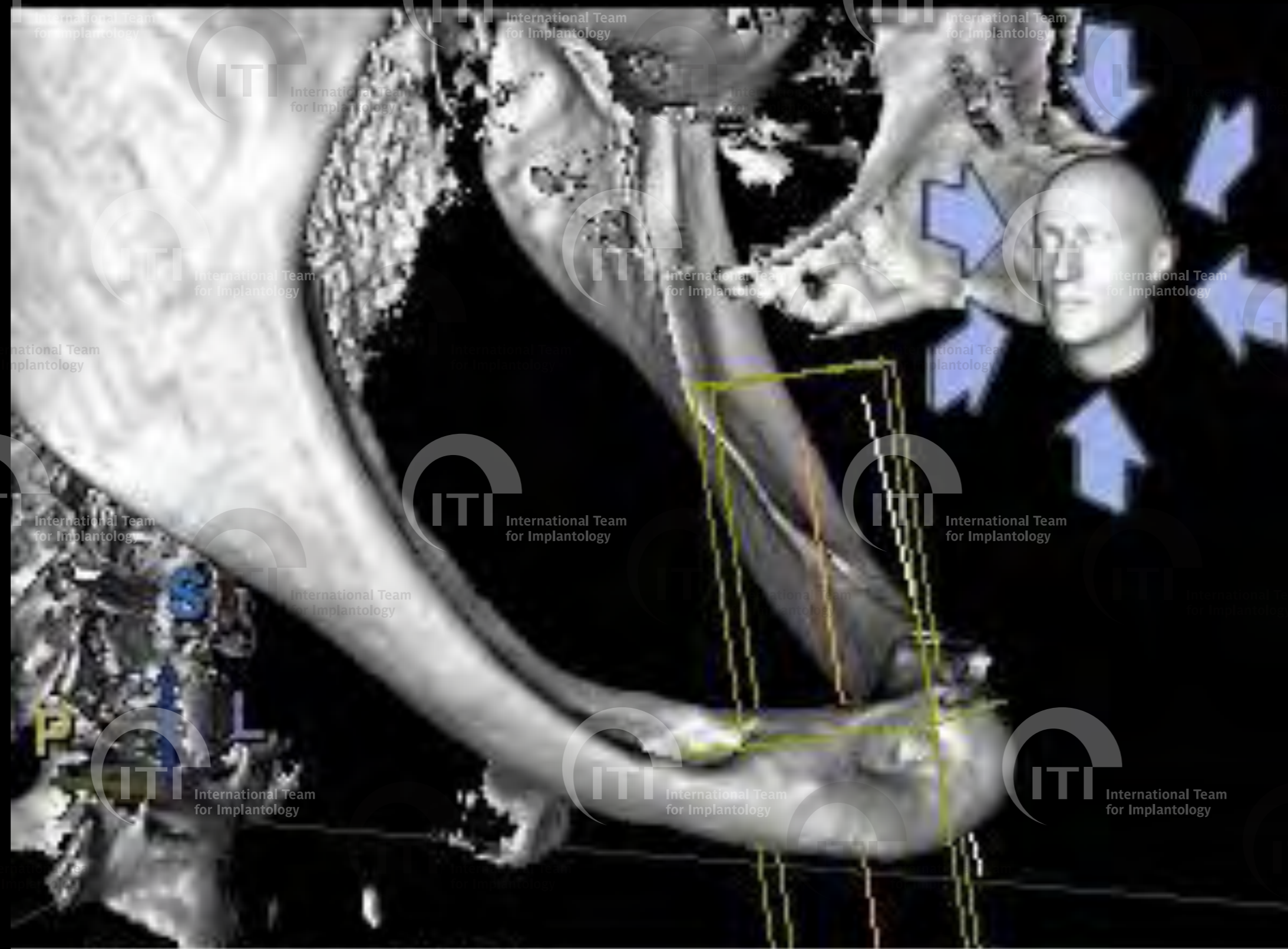
Avoidance of graft by using Ti-Zr 3.3mm implants



New treatment options with Ti-Zr 3.3mm implants



Minimal bone volume

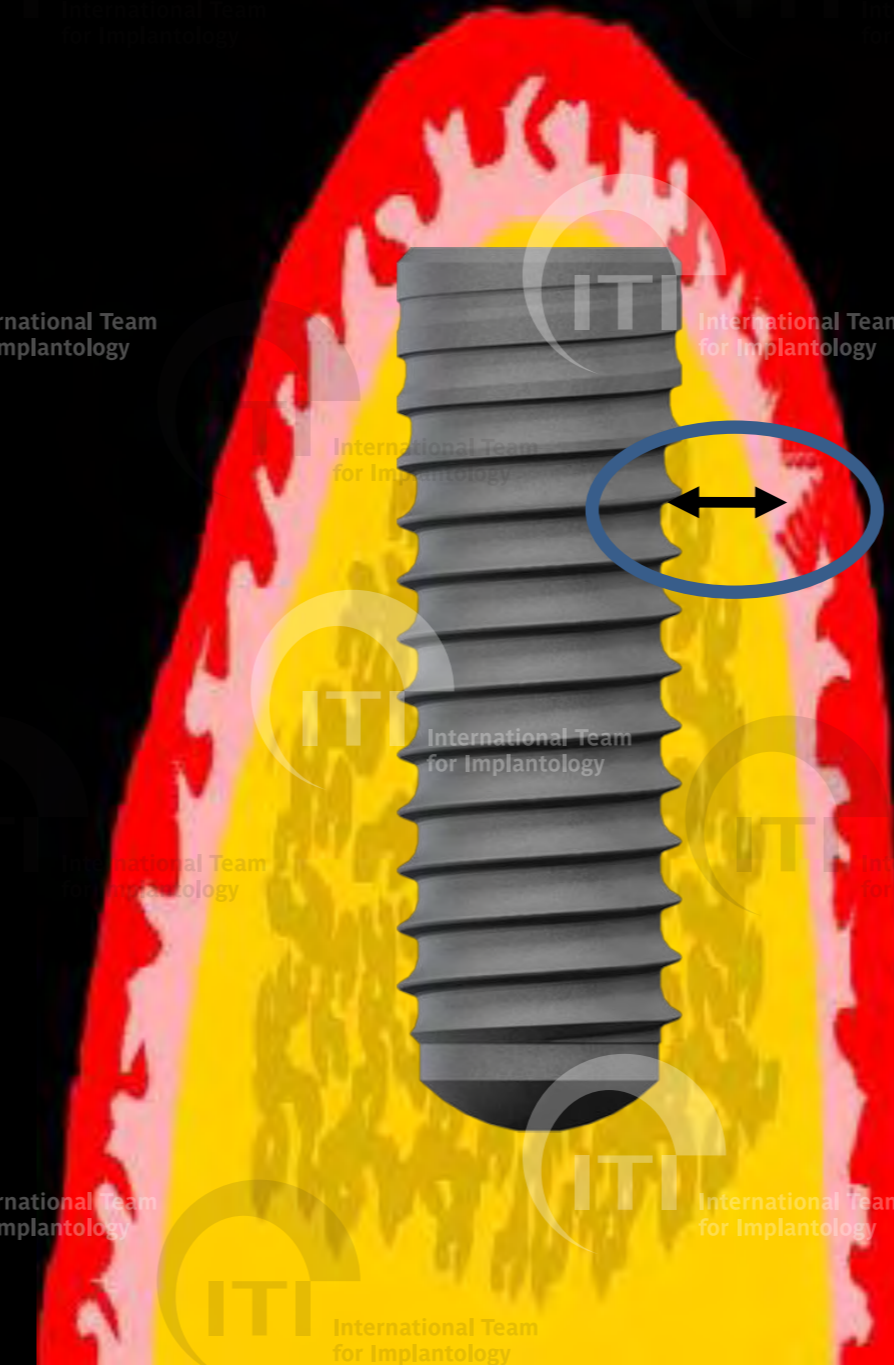


More
opportunities



For more
patients

Buccal bone thickness: minimum 1-2mm (Grunder U et al, 2005)



3.3mm

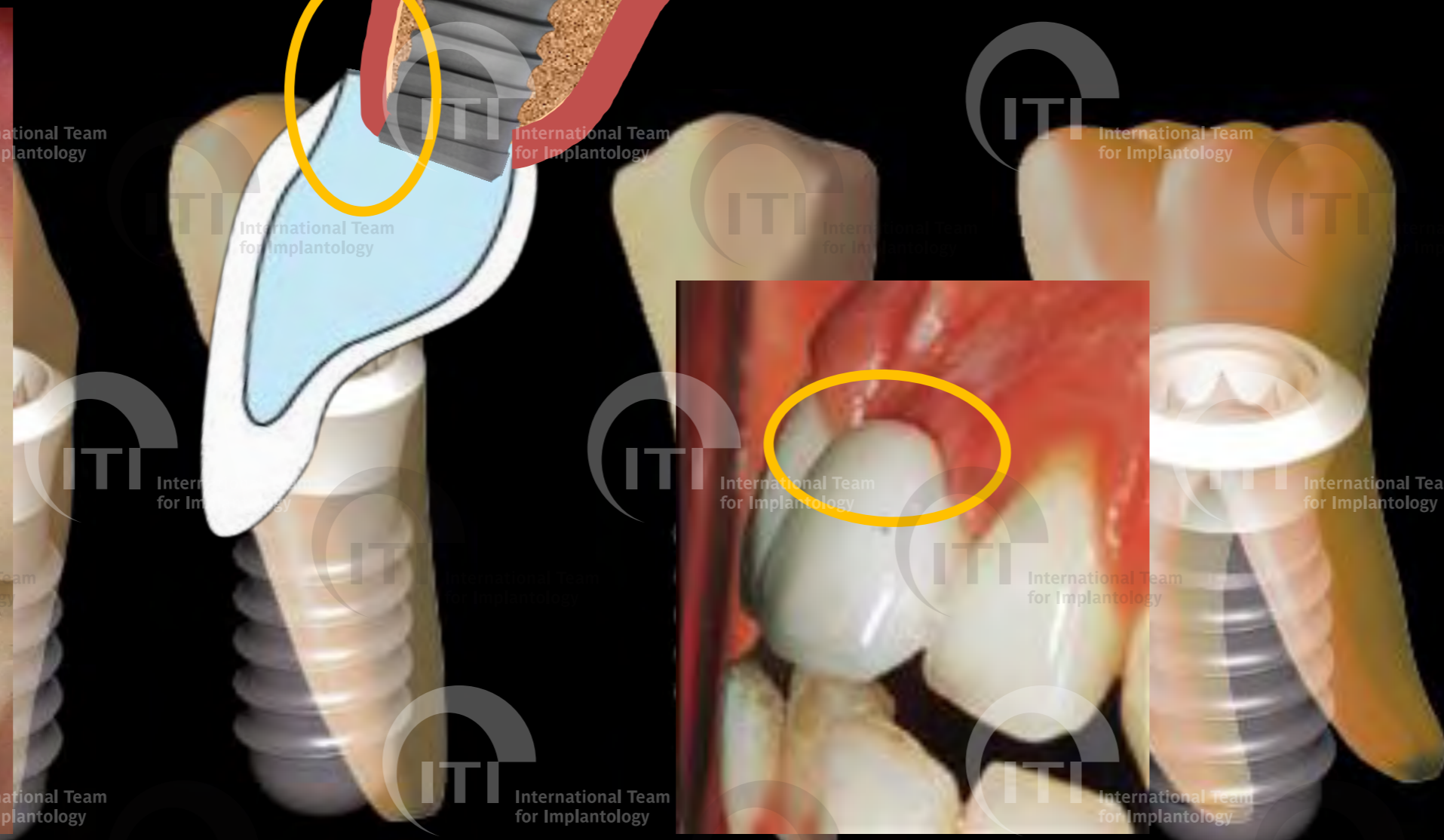


But...

Biofilm on dental implants: A review of the literature

(Subramani K. 2009)

Over contoured restorations:
– more biofilm formation and
plaque accumulation

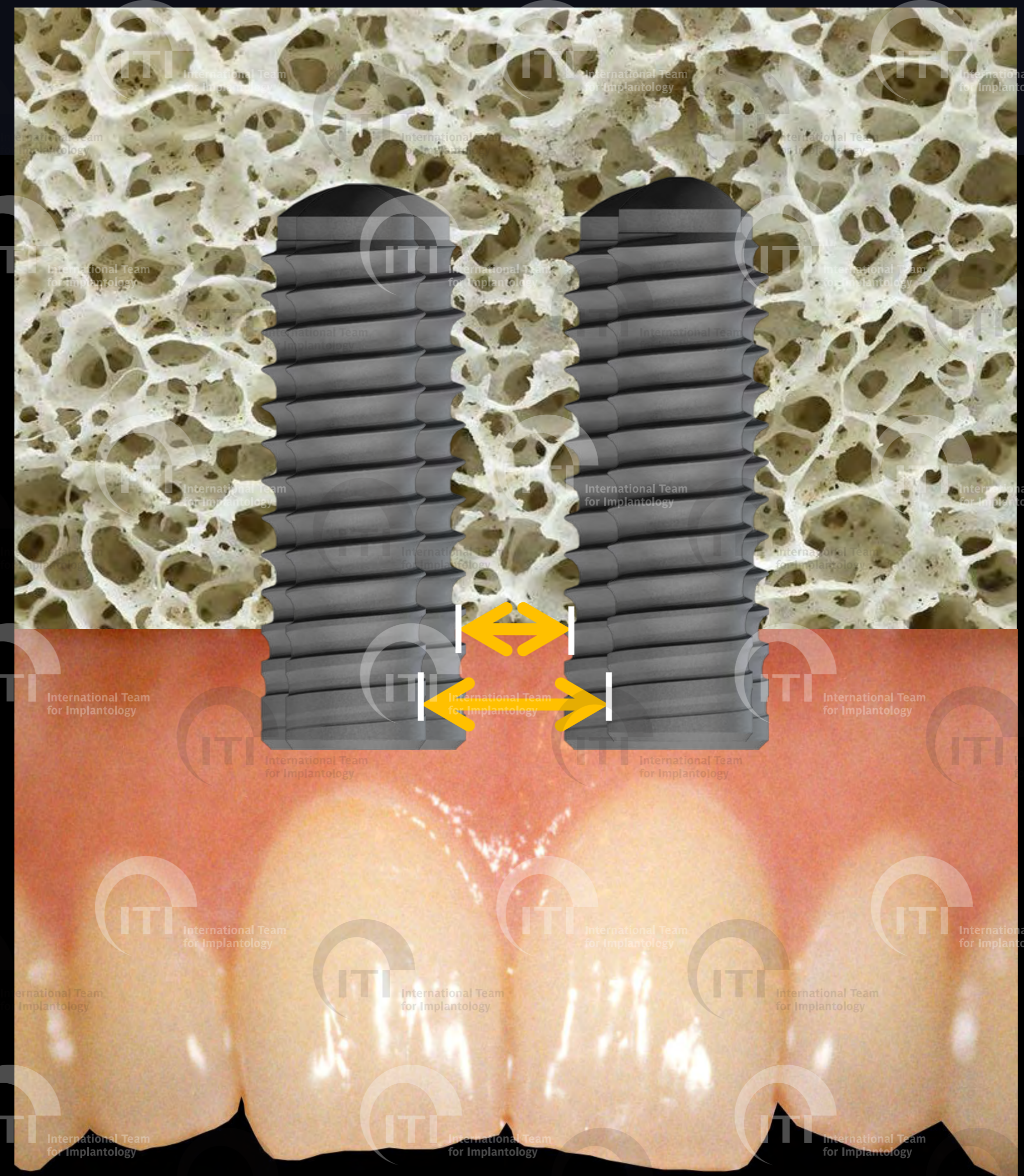


Mesio-distal Position:



The effect of inter-implant distance on the height of inter-implant bone crest.

Tarnow DP, Cho SC, Wallace SS. J Periodontol. 2000; 71 (4): 546-549



Potentially:
increased soft
tissue stability with
more aesthetic
predictability?

Ti-Zr alloy: indications

? Advantages:

- ✓ Improved bone attachment
- ✓ Increased options.
 - more strength
 - less grafting
 - patient acceptance
- ✓ Improved soft tissue stability
- ✓ Identical handling

Single tooth (including second premolars)

“Only **58%** of all suitable cases were treated with implants.”

Red

Survey results: Prof G Riegl
Institute of Healthcare Management, Augsburg, Germany

Fixed Implant Bruegwork

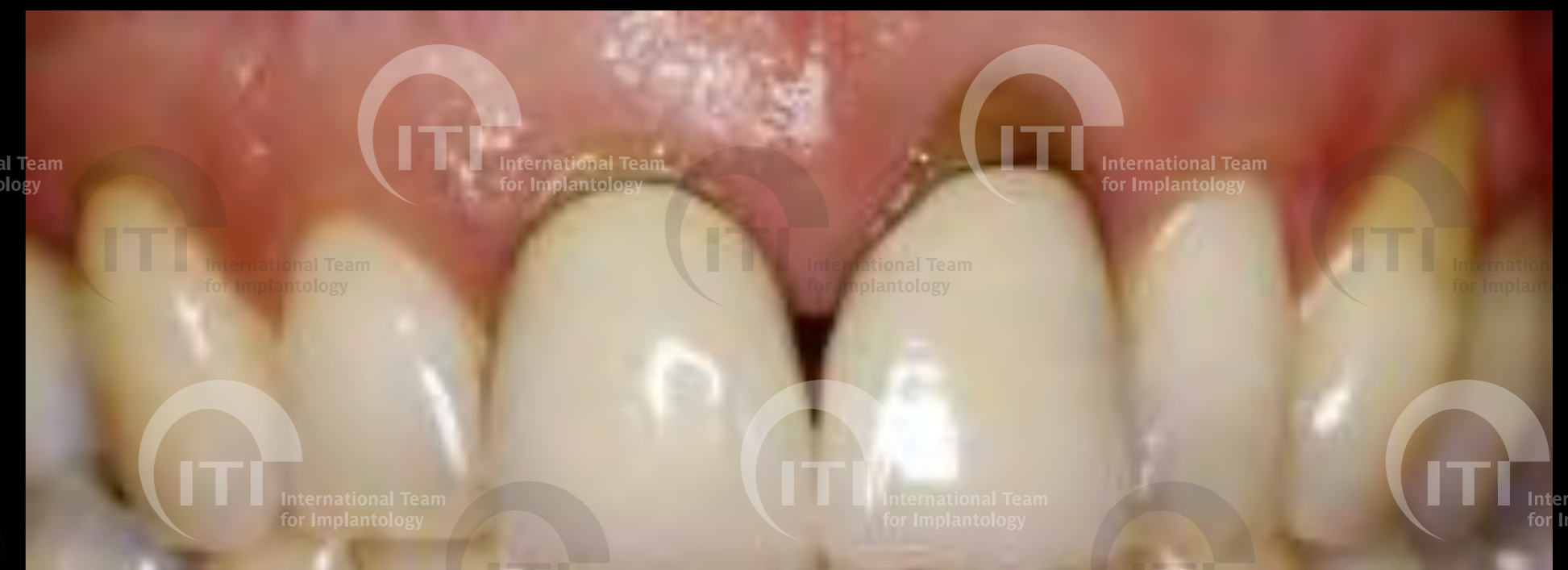
Full arch restorations

Does this mean **EVERWHERE** except molars?

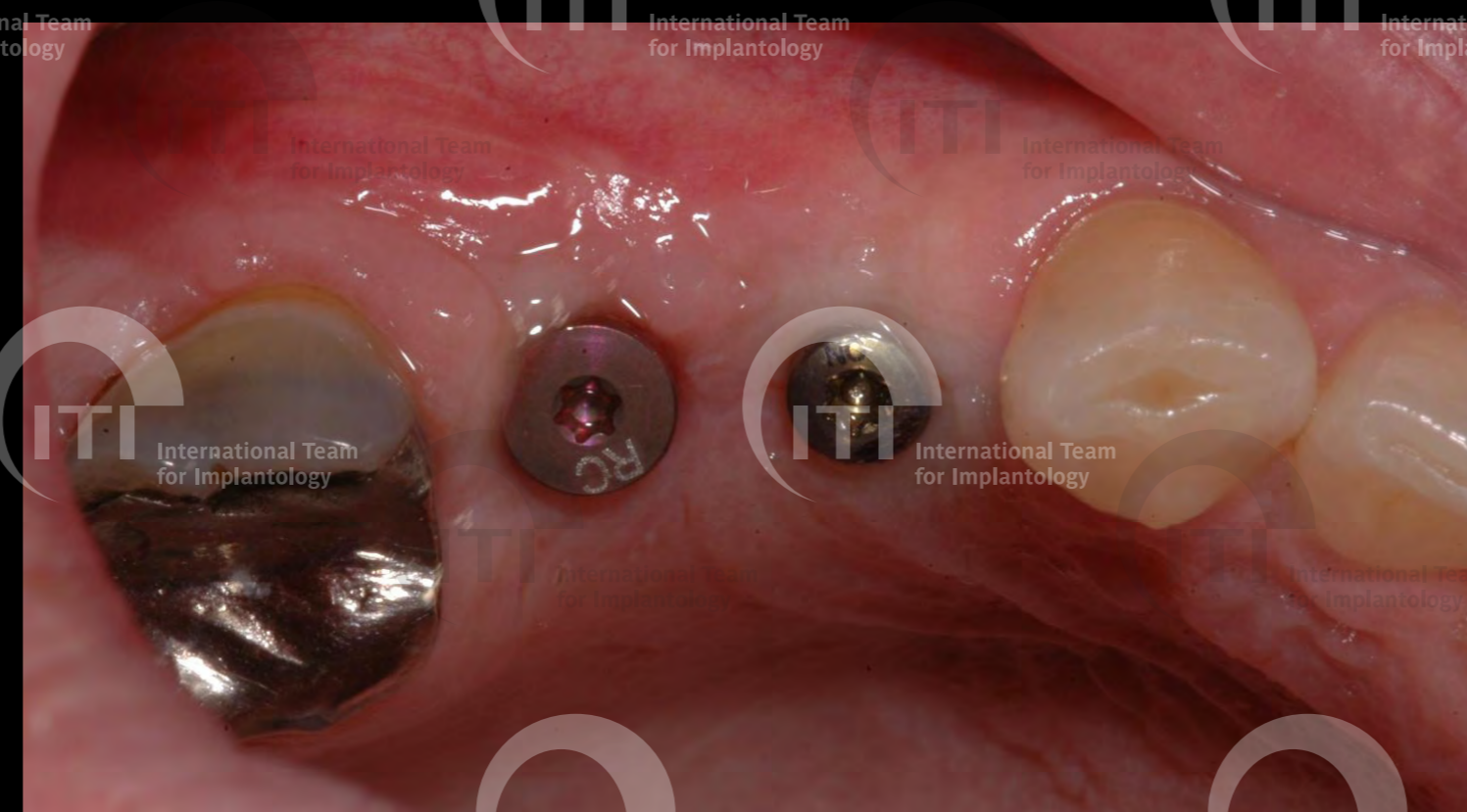
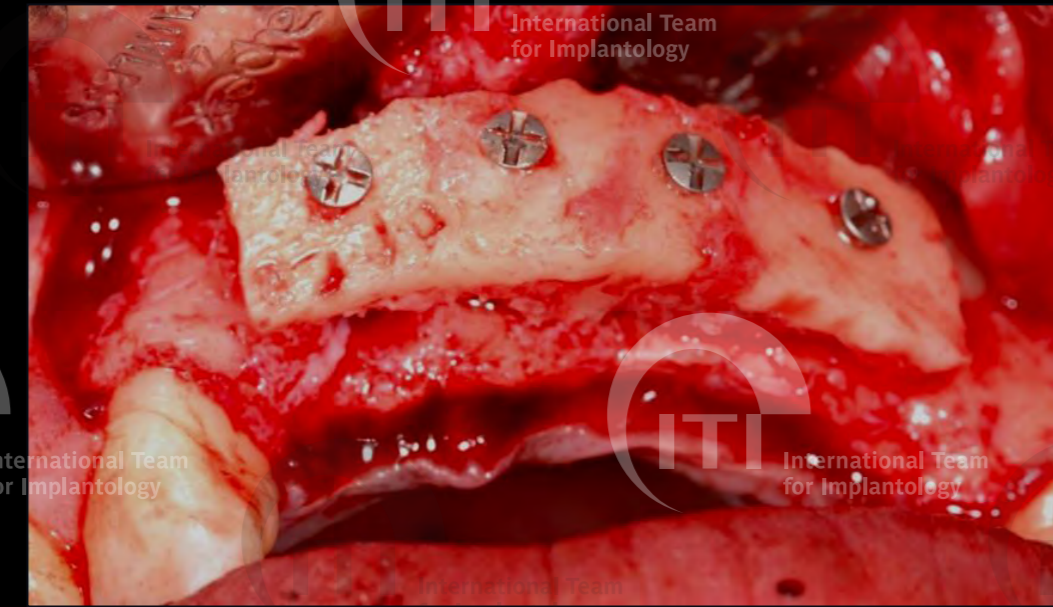
? Disadvantages:

- × Palatal implant position:
 - over-contoured restorations
 - biofilm formation
 - esthetic concerns
- × Additional cost (~ 50 Euros)
- × Abuse of properties

Clinical considerations:



New narrow body implants.



ITI World Symposium 2010

Thanks for
Your attention!

www.iti.org