The history and the types of oral implants

Prof. Dr.Tamás Divinyi

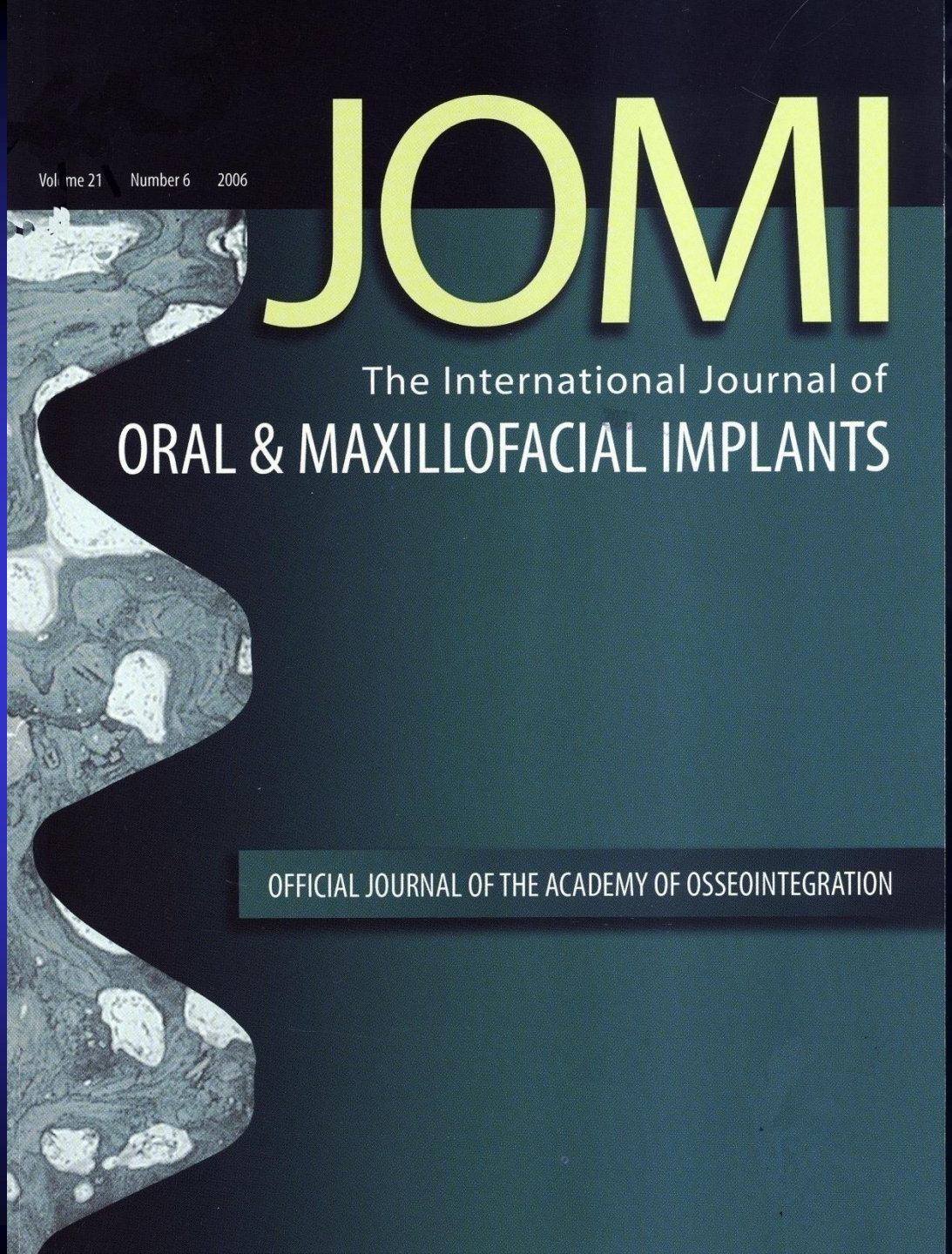
Semmelweis University, Faculty of Dentistry

Department of Oral and Maxillofacial Surgery

The oral /dental/ implantology is a newly developed field of dentistry, with the goal of prosthetic rehabilitation, but using also surgical, parodontological, orthodontical methods, in the complex treatment.

Volume 21 Number 6

2006



BICON INSTITUTE
MCMLXXXV

At The Bicon Institute, our CE courses are designed to present the advances of implant placement and prosthetic techniques to the trained dental specialist, and to address the clinical advantages of

EDITORIAL

Oral Implants—Quo Vadis?

The advent of oral implants, initiated by Brånemark about 40 years ago, has no doubt revolutionized oral and dental medicine. Conservative prosthodontics have only survived because the financial means of patients in need of tooth replacement are limited.

Watzek G.: Oral Implants – Quo Vadis?

Int. J. Oral Maxillofac.Impl. 2006; 21: 831

501 Arborway
Boston, MA 02130 USA
tel: 800.88.BICON
fax: 800.28.BICON

Printed in USA LIT

though they are just as good as fixed partial dentures. However, these high patient expectations are often exaggerated and/or the result of pressure from the industry.

fecting surgical implant placement. At the same time, ridge augmentation with bone autografts, still needed today before or during implant placement, will gradually lose its current importance. Easier and

Comparison of the success rate of conventional and implant prostheseses

	5 years	***10 years***
Tooth supported FDP	93.8%	89.2%
Cantilevered FDP	91.4%	80.3%
Resin bonded FDP	87.7%	65%
Implant supported FDP	95.2%	86.7%
Implant crown	94.5%	89.4%

/Peatursson B.E. 2009/

The oral implantology has been taught since 1994 in the undergraduate dental education at the Dental Faculty of Semmelweis University.

Introducing it in the undergraduate theoretical teaching, Budapest was the Nr. 1. in Europe!

Ancient attempts for replacement of lost teeth

In the sites of missing teeth,securing to the remaining ones

In the sites of missing teeth, placed into oral tissues

↓

Oral implantology

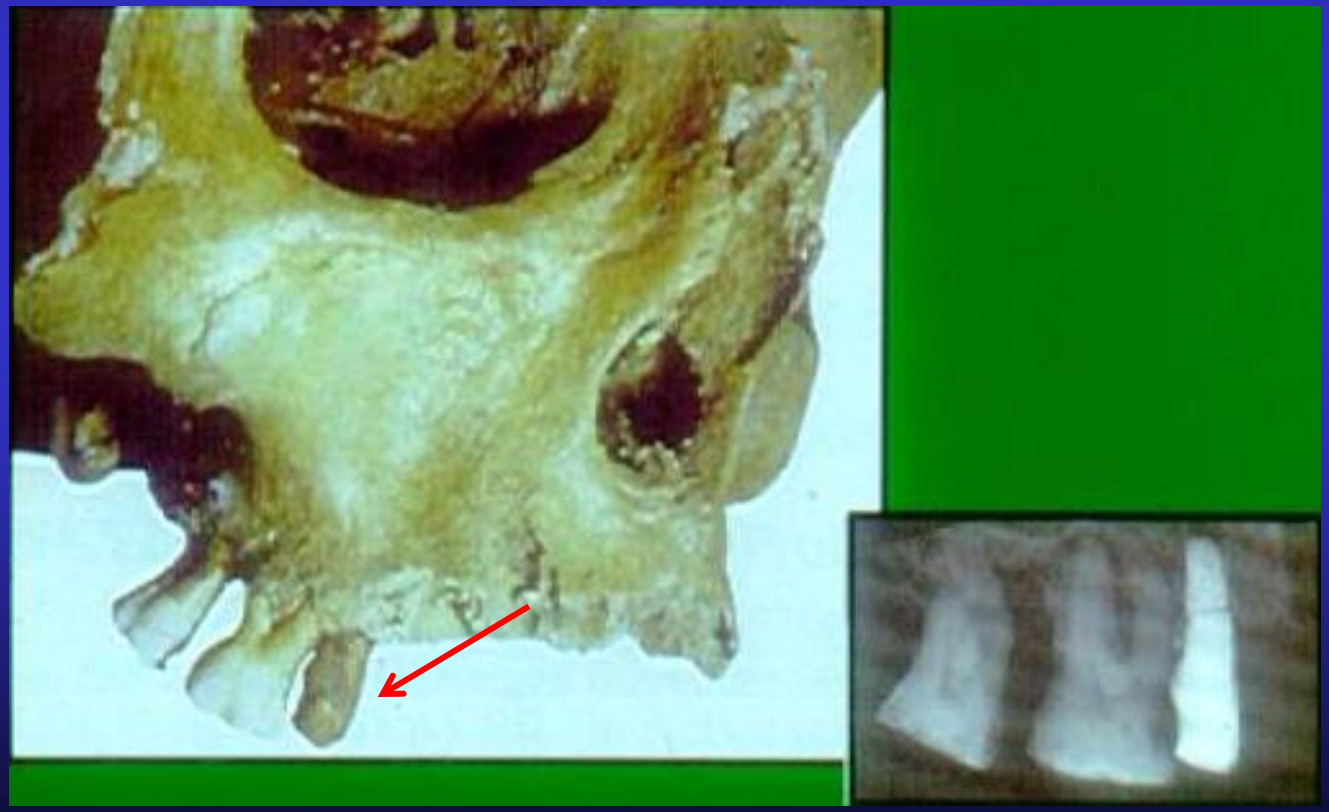
In the times of ancient Egyptian, South-American, Greek cultures

Alloplastic materials: gold, wood, animal teeth

There are no correct antropological findings, from that age!

Wrought iron implant replacing the second premolar 1-2. century A.D.

(Chantambre, France)



Skull from Mayan civilization, in the 7th. century

/Excavation in Honduras 1933/

In the site of lower incisors, teeth made from seashell

Tooth replantation

1647 Dupont

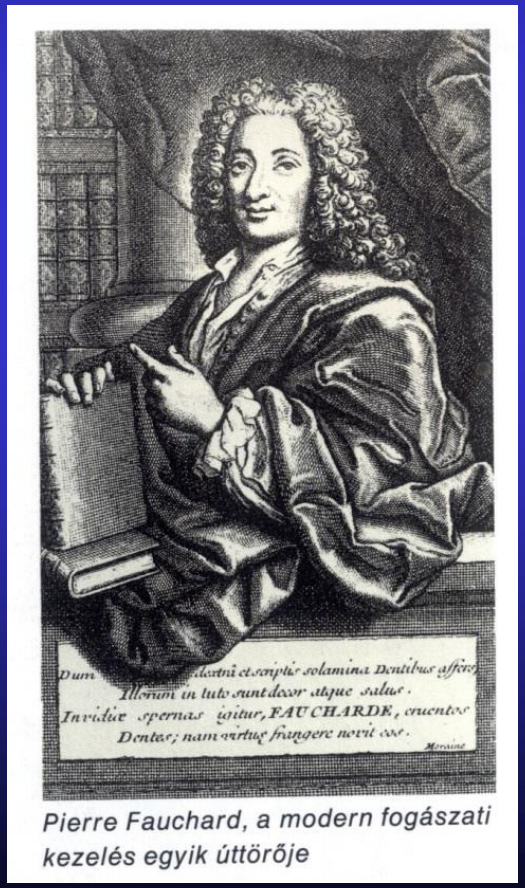
Dentist of King Louis XIII.

Tooth transplantation

Pierre Fauchard /1678-1761/

„Le chirurgien dentiste ou traite des dents”

Pioneer of modern dentistry!

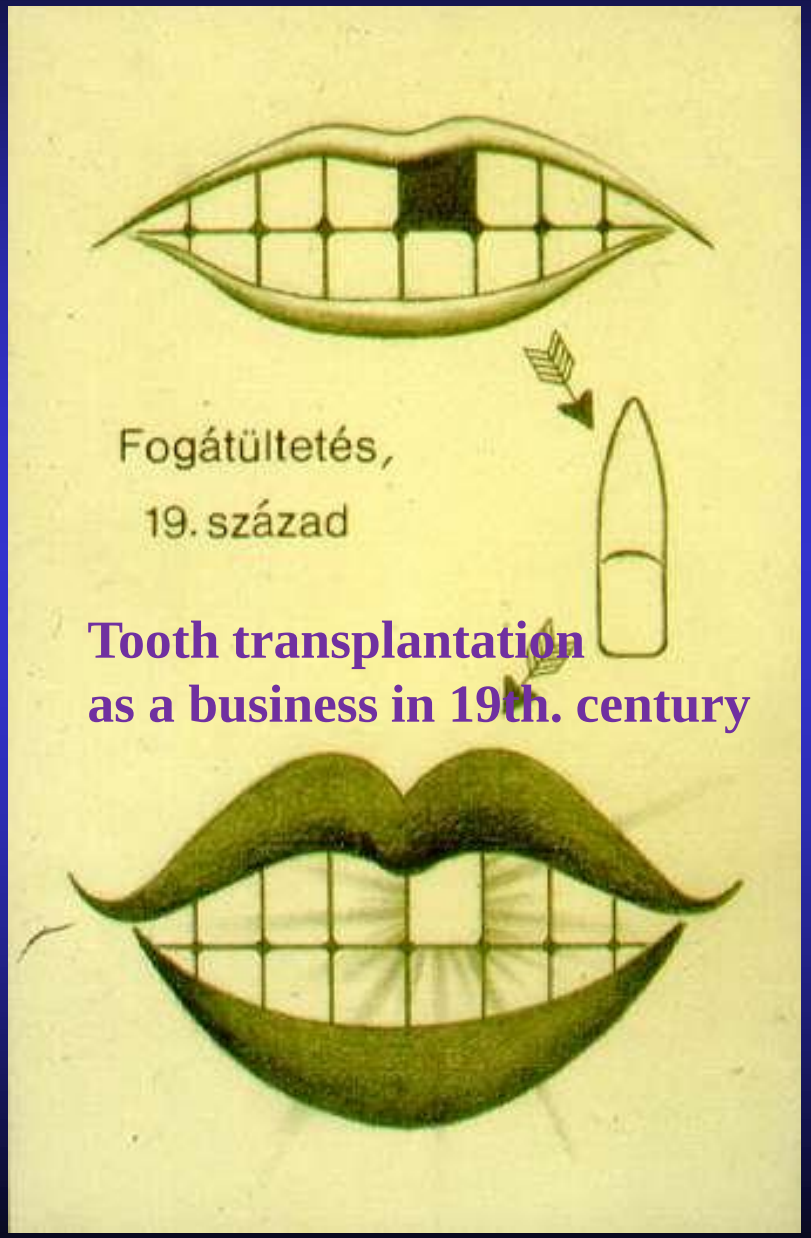


Pierre Fauchard, a modern fogászati kezelés egyik úttörője

Serre 1804

Surgical protocoll of tooth transplantation with socket preparation.

Warning against diseases transmissable by transplantation /Syphilis!/



Tooth transplantation as a business in 19th. century

19th. Century :

Alloplastic materials

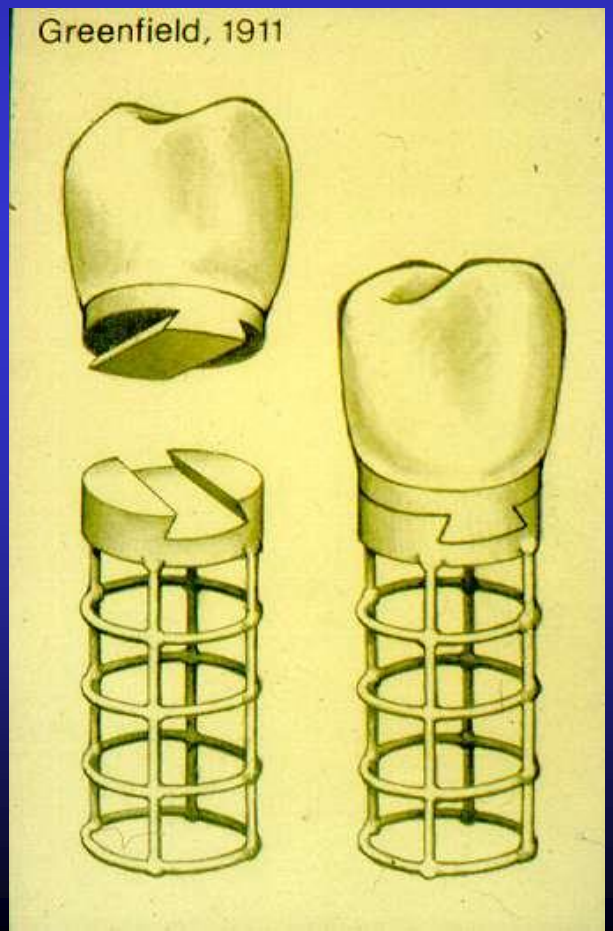
Jourdan, Maggiolo 1807

The firs endosteal implant made of iron and later of gold

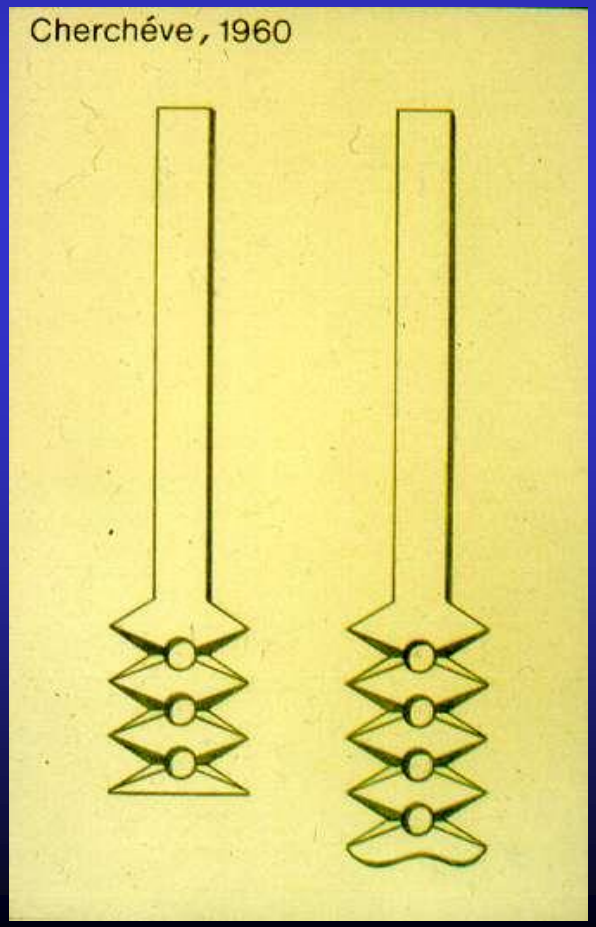
Znamensky /Moscow/ **1891**

Implant made of caoutchouc and porcelain

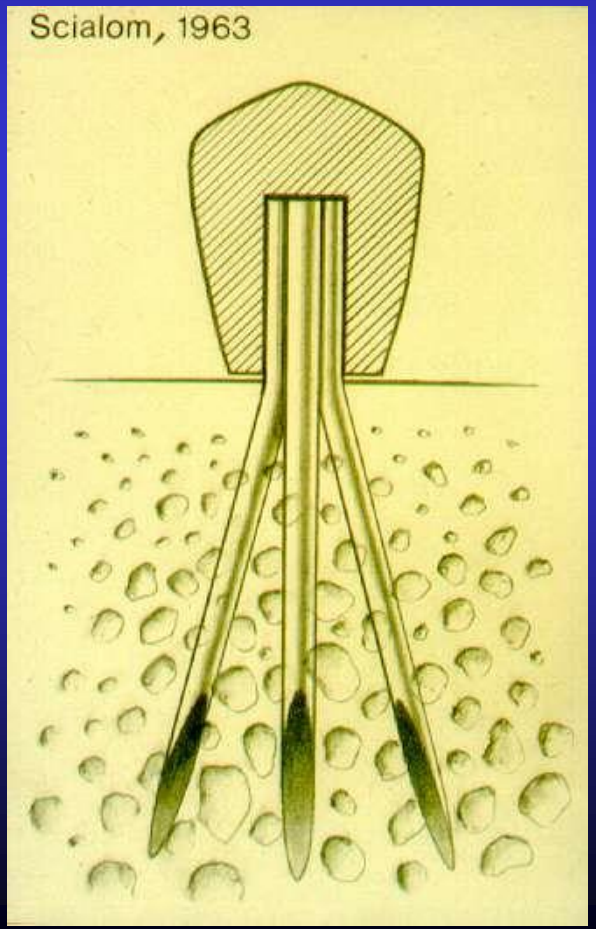
Greenfield 1911
Material: platinium--iridium



Cherchéve 1960
Material: tantal



Scialom 1963
Material: tantal



The first biocompatible alloy

Vitallium /Cr-Co-Mo/

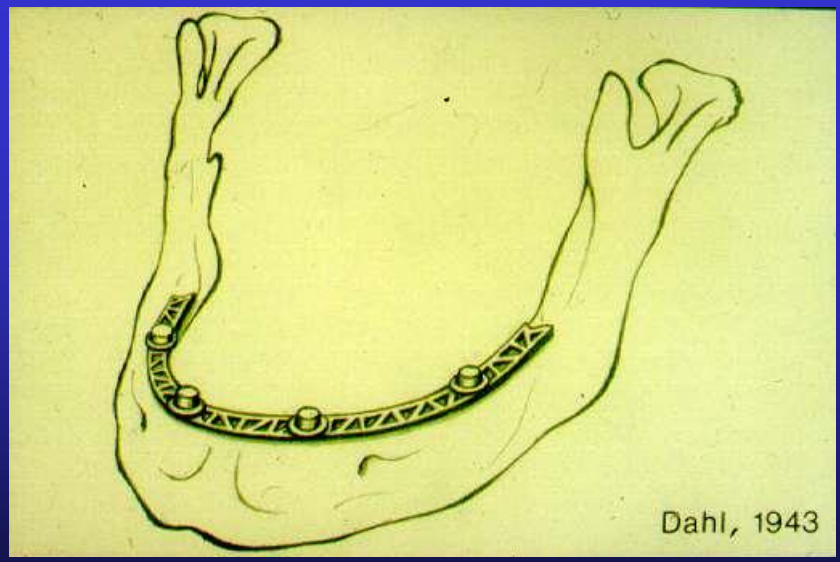
Albert W.Merrick

Austenal Laboratory, New York **1932**

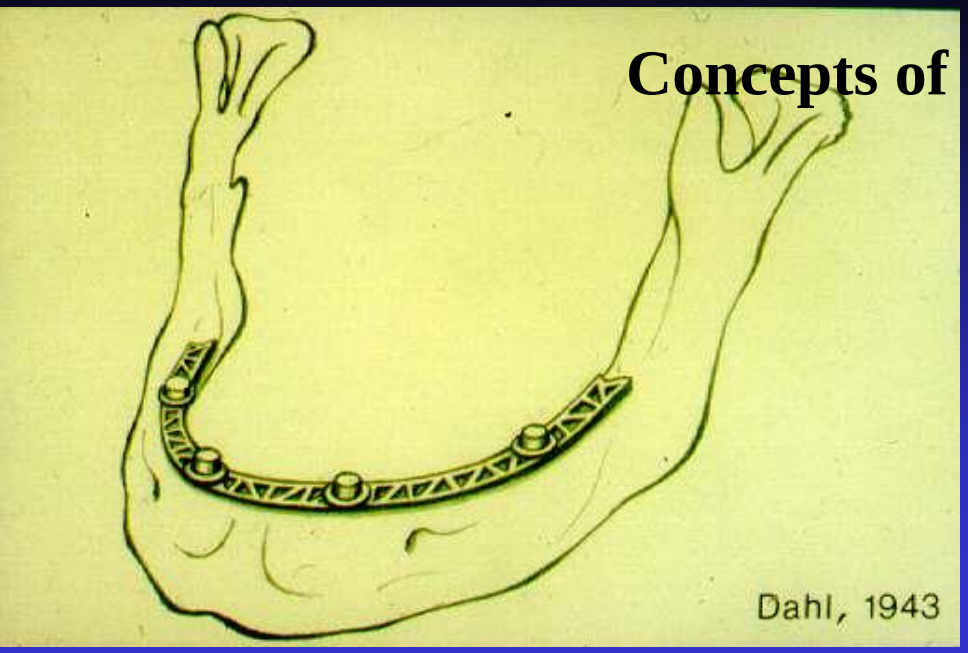
Surgical method of subperiosteal implant made of Vitallium

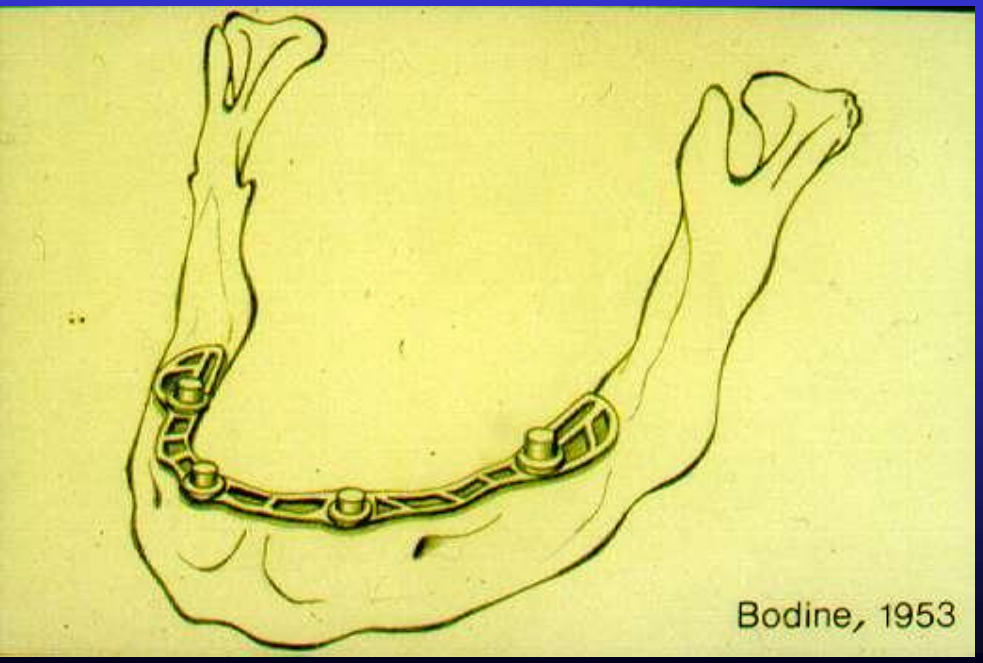
!

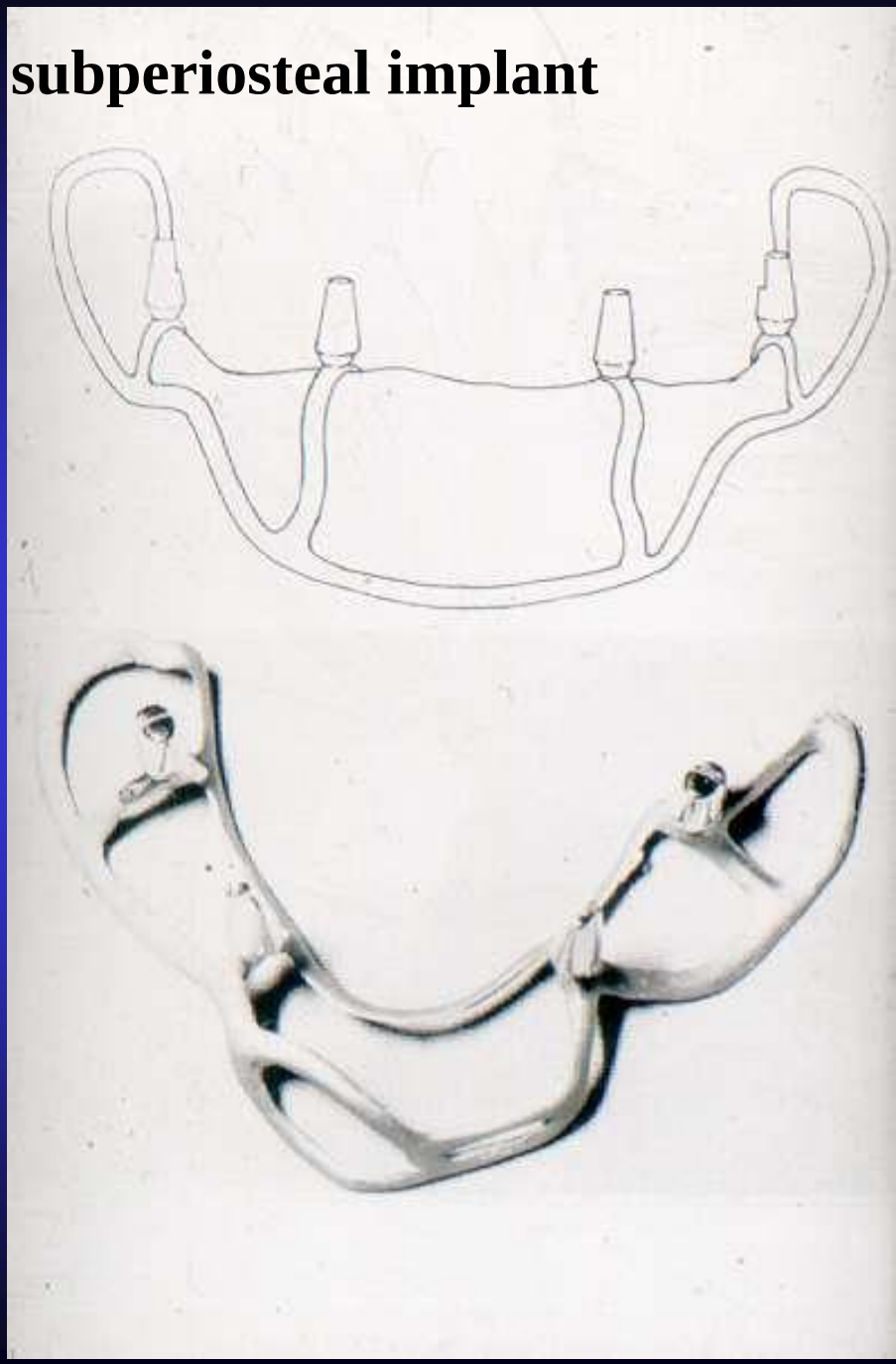
Dahl/Sweeden/ 1943



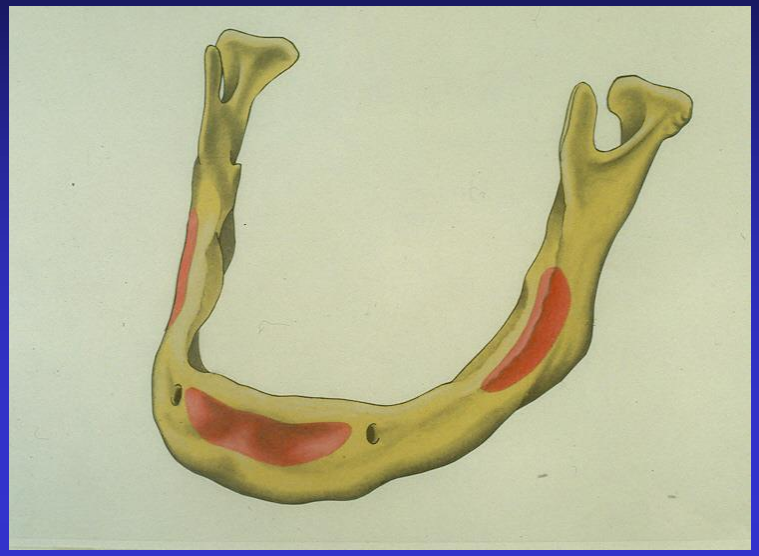
Concepts of subperiosteal implant

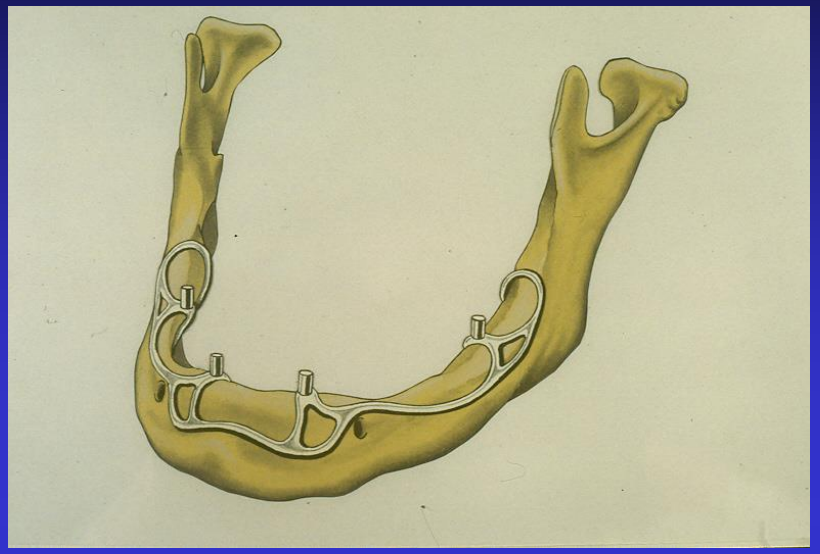


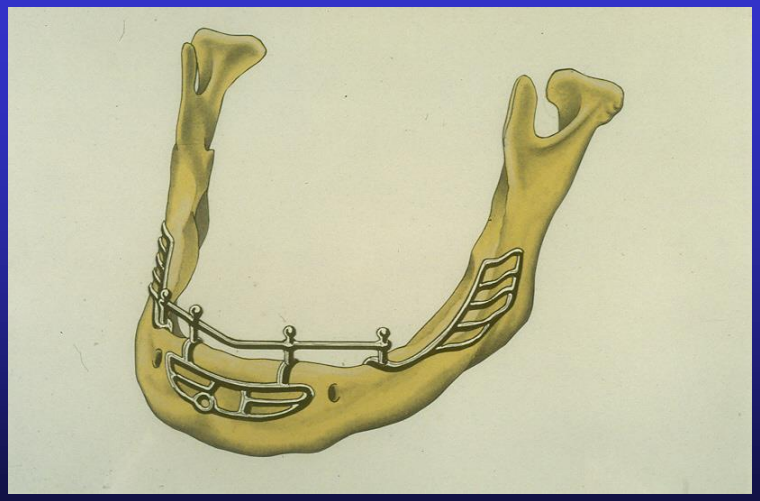


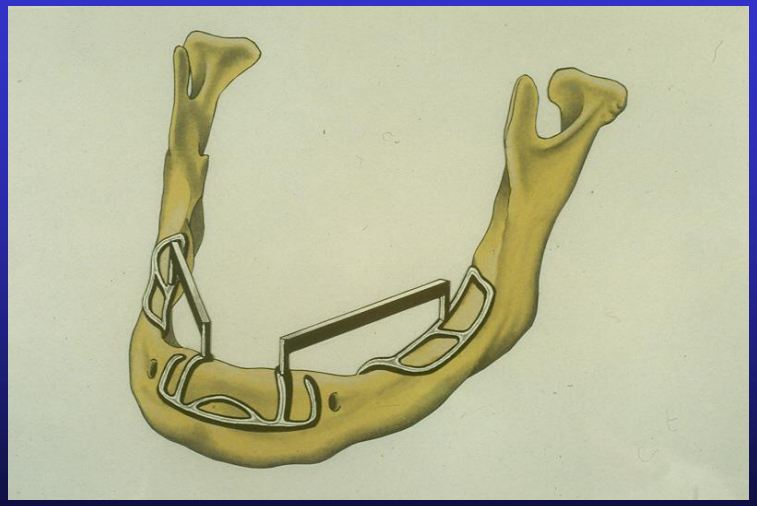


Completing of a subperiosteal implant

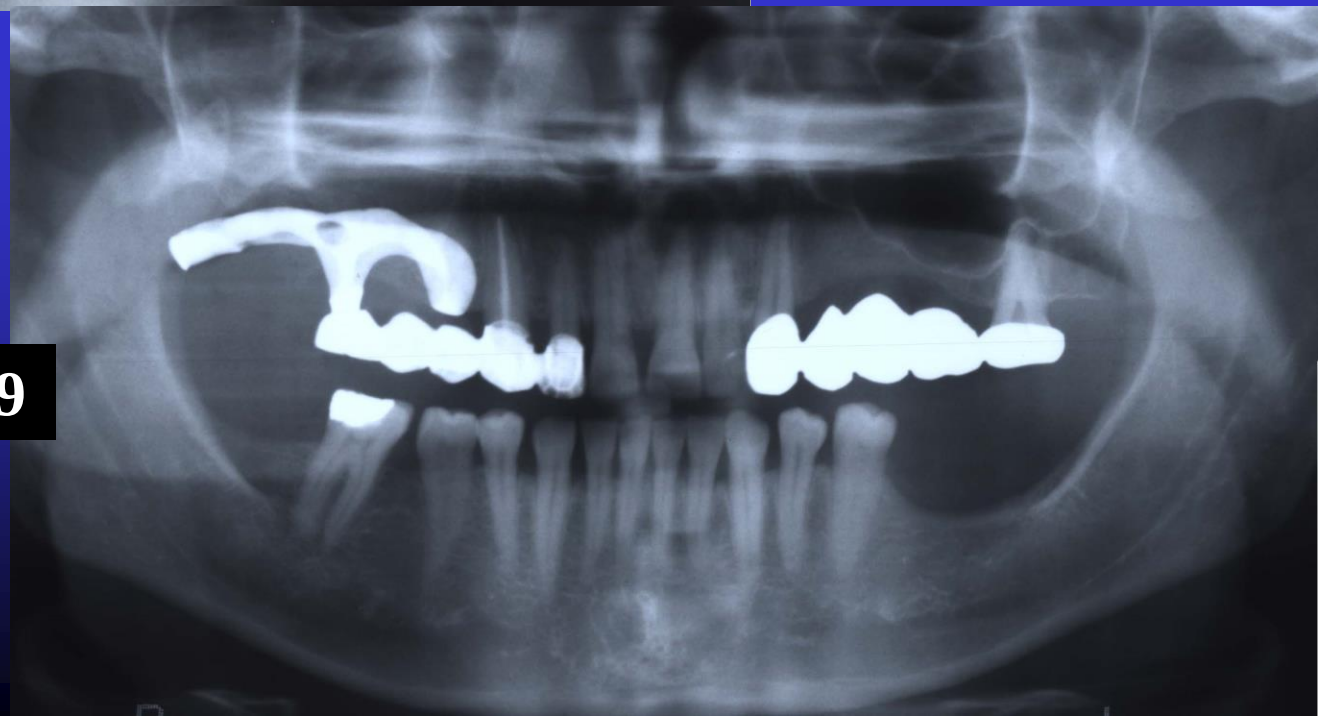






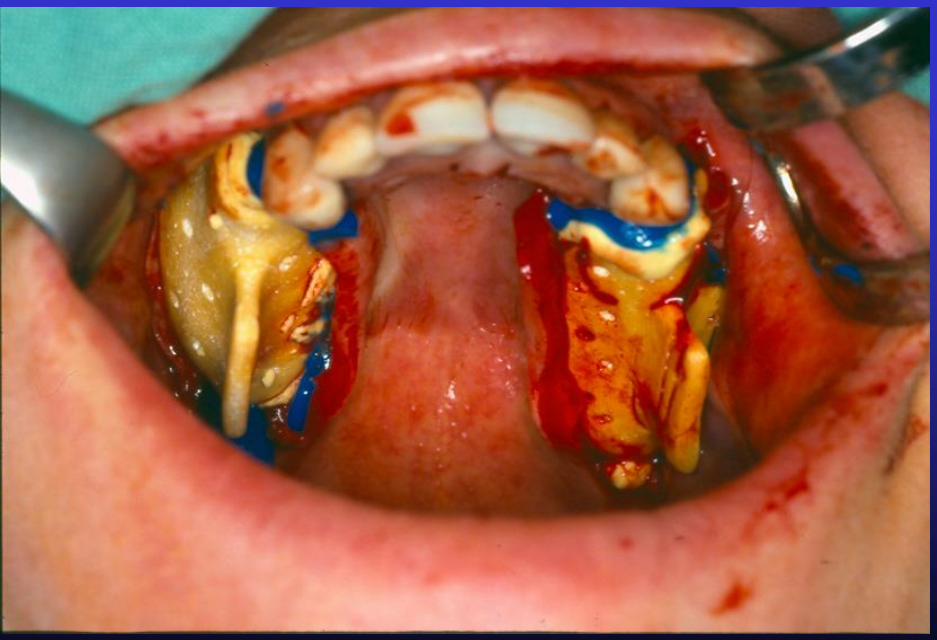


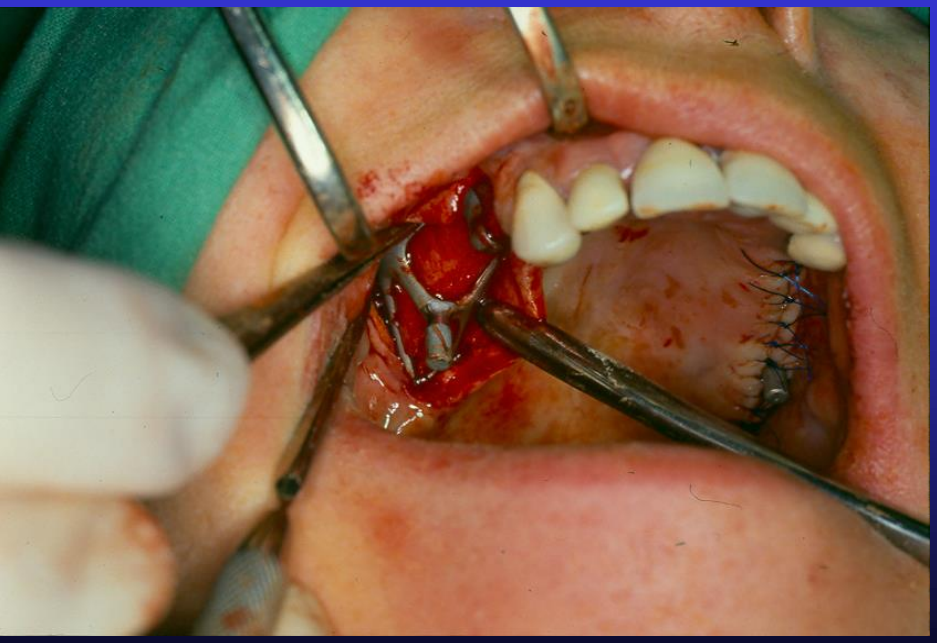
1991.01

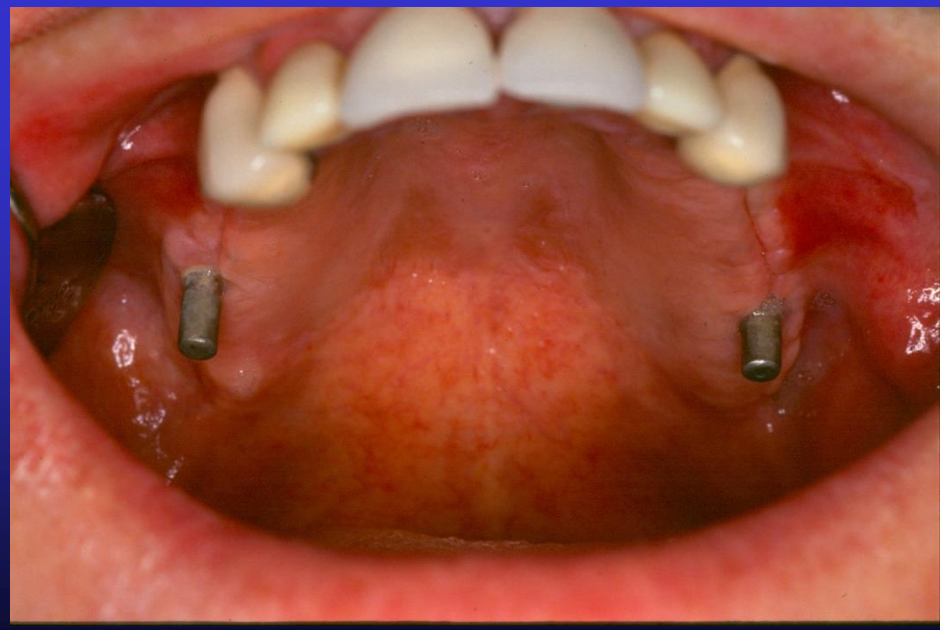


2004.09

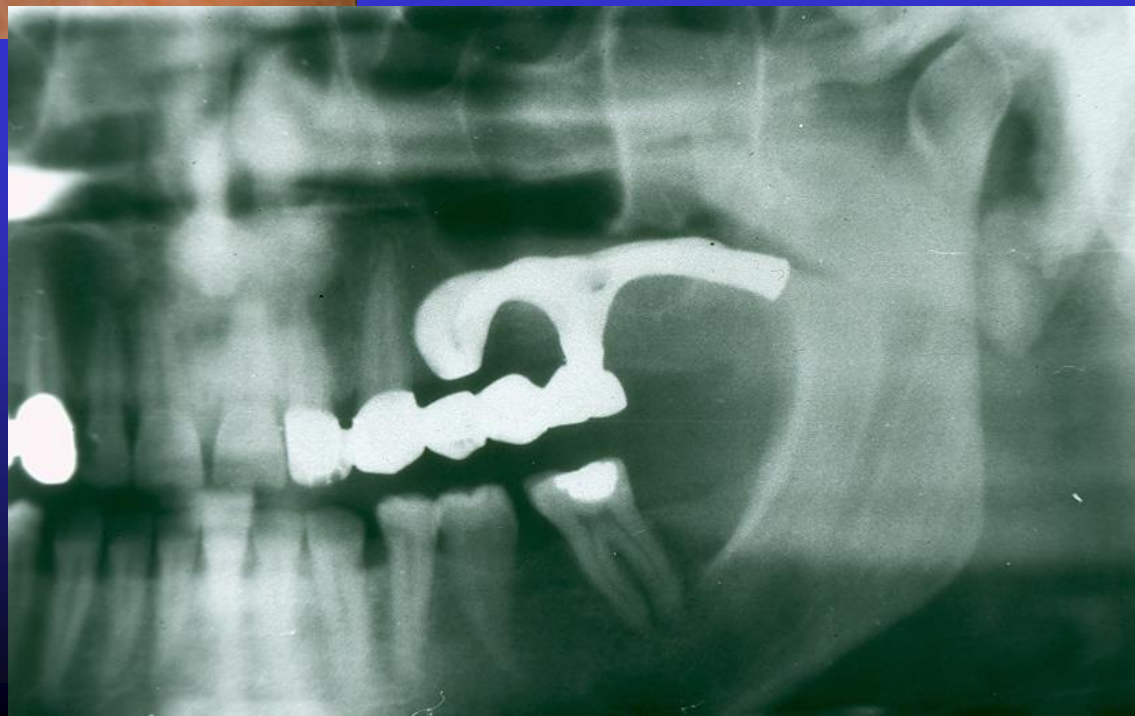
Lower, partial subperiosteal implants

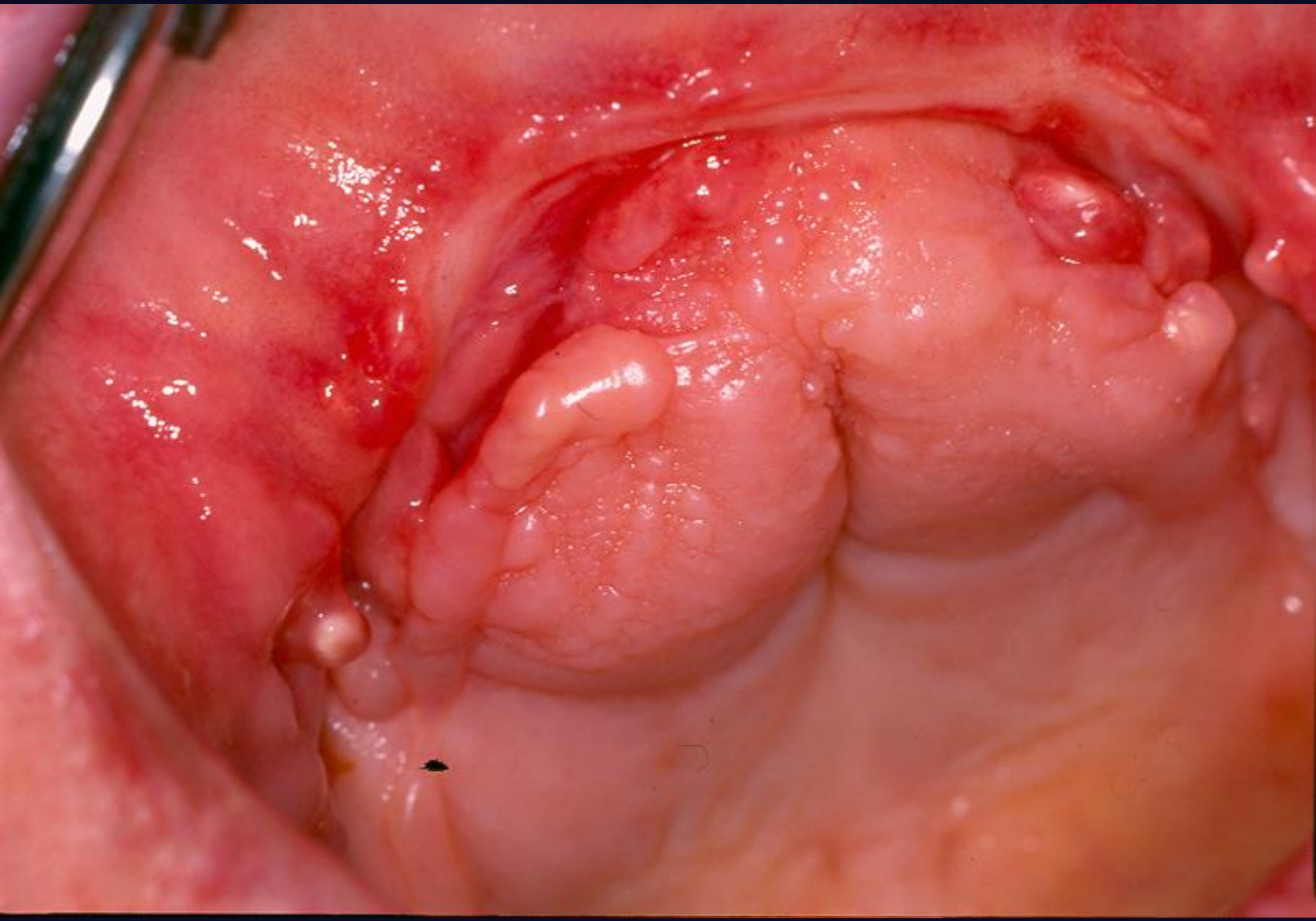






The failures of subperiosteal implants





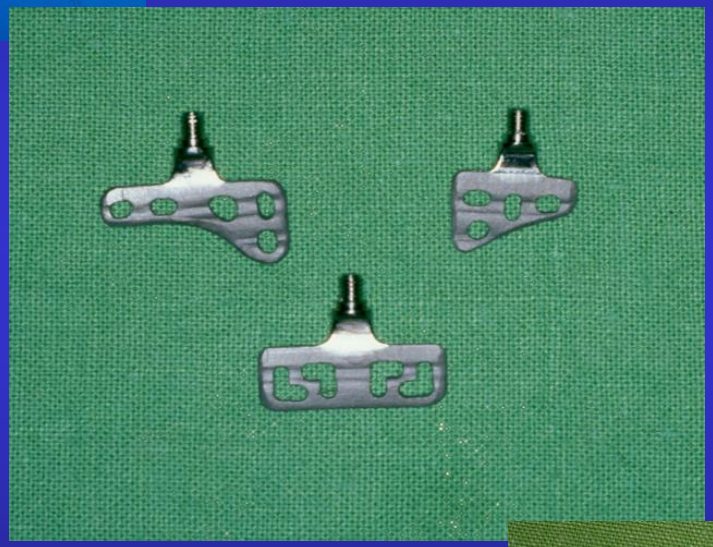
Endosteal implants

Leonard Linkow 1966

- **Material: titanium**
- **Shape: blade-vent implant**
- **Mechanism of attachment: „pseudo-periodontium”**

Titanium, blade-vent implants

The position of blade-implant in the bone and various forms.



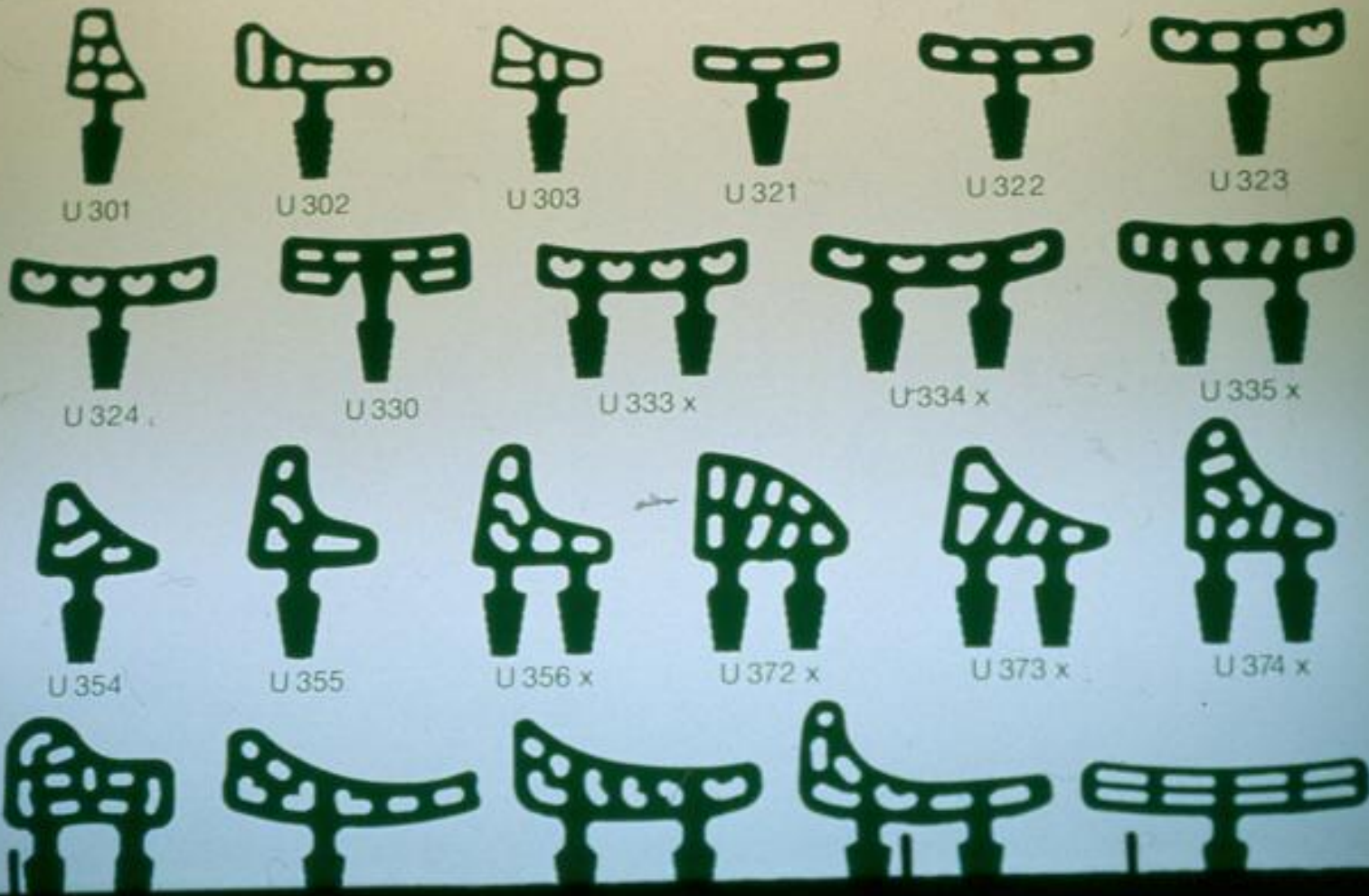
RÖNTGEN-INDIKATOR 2

Formen für den **Oberkiefer** — Vergrößerungsfaktor 1 : 1,26 mm

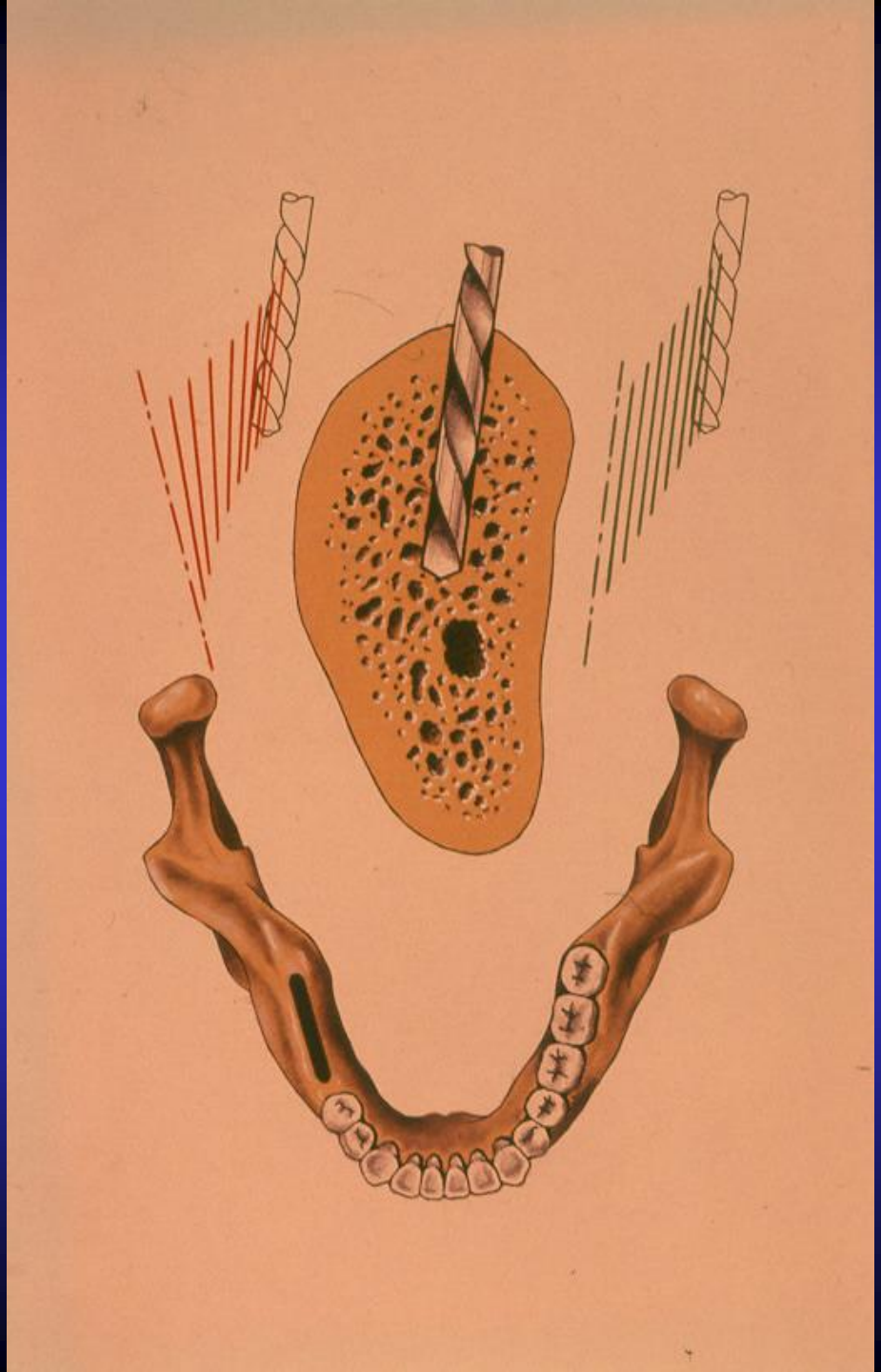
ORALTRONICS® Telefon: **04 21/49 27 49 + 49 15 25** Best. Nr. 1650

Marketing- u. Vertriebs GmbH Osterdeich 72 D-2800 Bremen 1, West-Germany

Alle Implantatformen auch zweiphasig in RP - A oder RP - B erhältlich



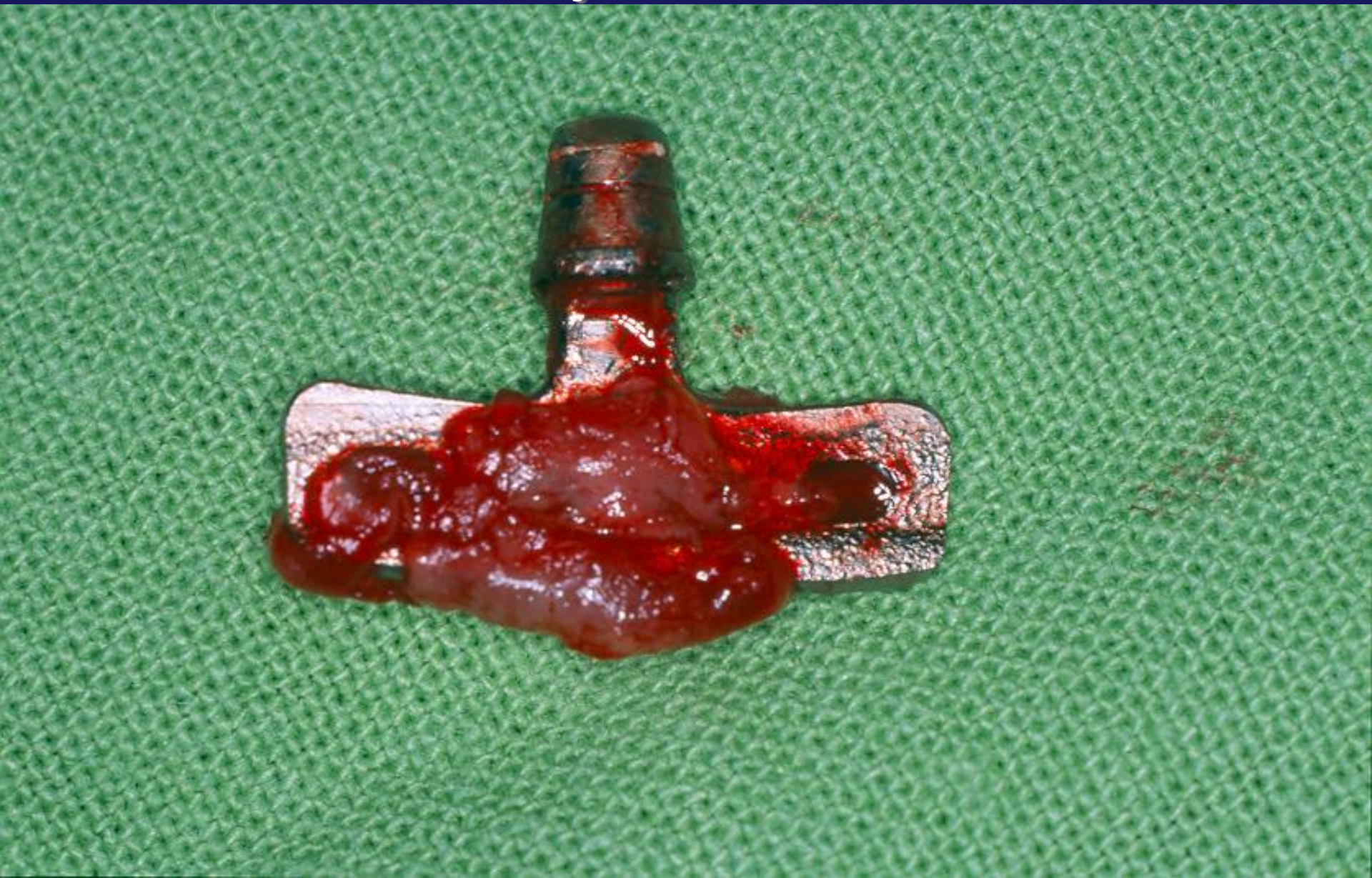
Surgical bone preparation for placing a blade-vent implant



One-piece blade implant placed

Blade implant with threads for the abutment

Removed blade implant with a thick layer of connective tissue



Per-Ingvar Bränemark 1969

- **Material: titanium**
- **Shape: screw-type implant /fixture/**
- **Mechanism of attachment: osseointegration**

OSSEOINTEGRATIOIN

!

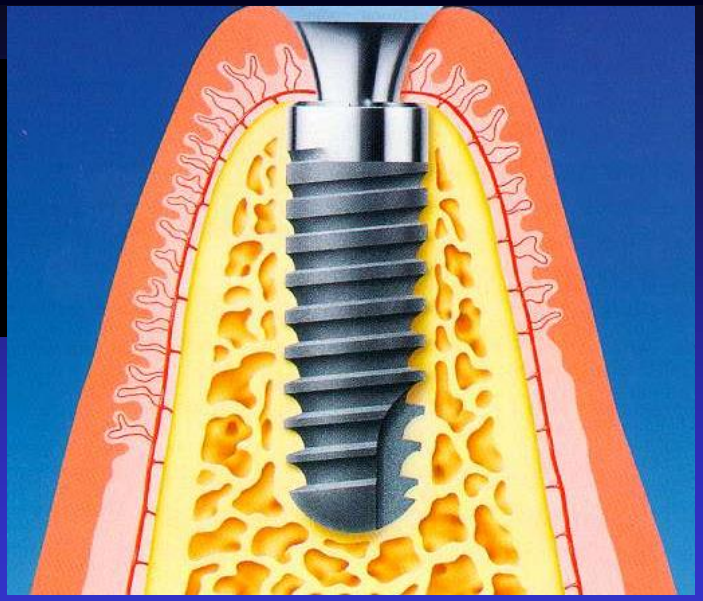
Direct contact between the implant and bone at light microscopic level

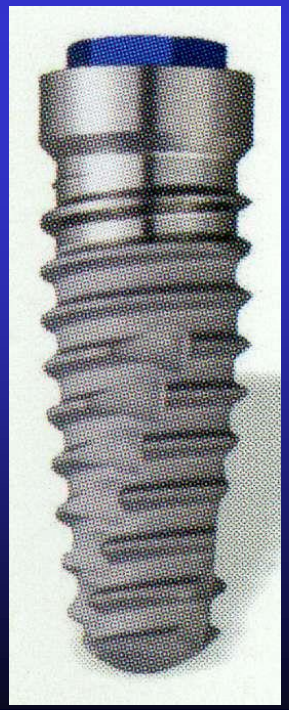
fibro-osseointegration → blade implants

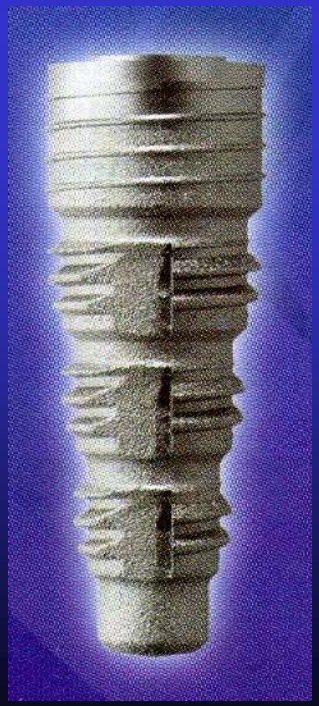
versus

osseointegration → screw implants

Titaniun screw-type implants







Modern Implantology:

discovery of osseointegration, followed by intensive scientific research

/1969,1977--/

!

The development of modern oral implantology

Phase 1. Pioneering. First clinical experiences. **1970-80**

Phase 2. Systematic, fundamental researches.

Planned clinical applications. **1980-90**

Phase 3. Clinical controls /randomized studies/.

Extended clinical applications. **1990-2000**

Phase 4. Generally extended indications

/GBR, Bone grafting/.

Increasing demands /esthetic, loading/. **2000-**

We have today close to

600

different implant systems produced by at least

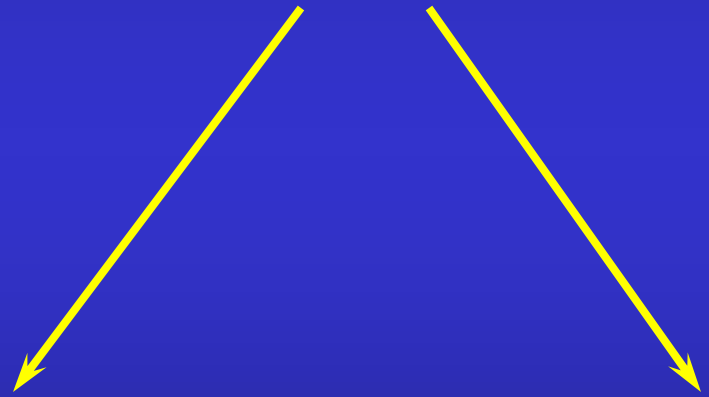
146

different manifacturers…

/Jogstad A.:Osseointegration and dental implants Wiley-Blackwell 2009/

IMPLANT

IMPLANT SYSTEM



SURGICAL INSTRUMENTS

PROSTHETIC COMPONENTS

IMPLANT

IMPLANT SYSTEM

SURGICAL INSTRUMENTS

PROSTHETIC COMPONENTS

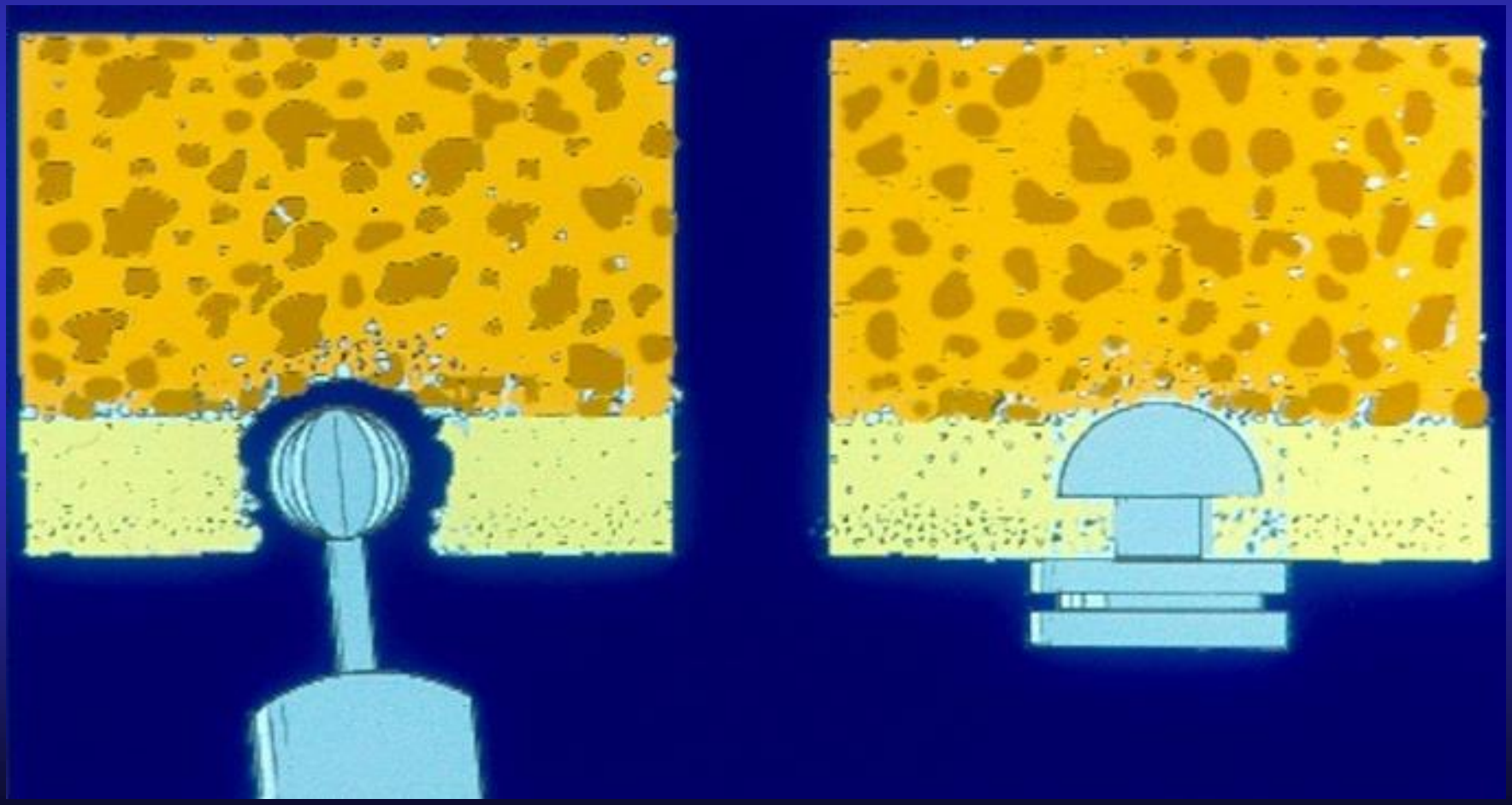
Classification of oral implants based on their anatomical location

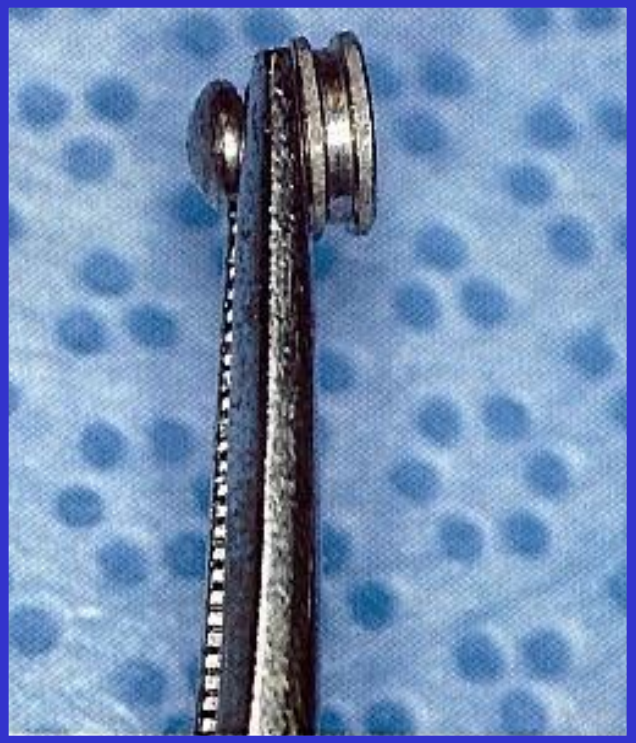
- intramucosal
- subperiosteal
- transmandibular
- transdental
- endosteal

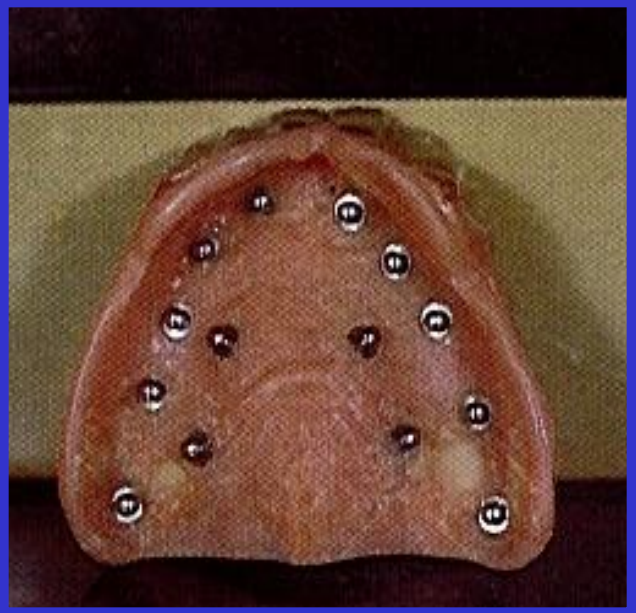
Classification of oral implants based on their anatomical location

- **intramucosal**
  - subperiosteal
  - transmandibular
  - transdental
  - endosteal

Intramucosal insert







Intramucosal implant

Classification of oral implants based on their anatomical location

- intramucosal
- **subperiosteal**
- transmandibular
- transdental
- endosteal

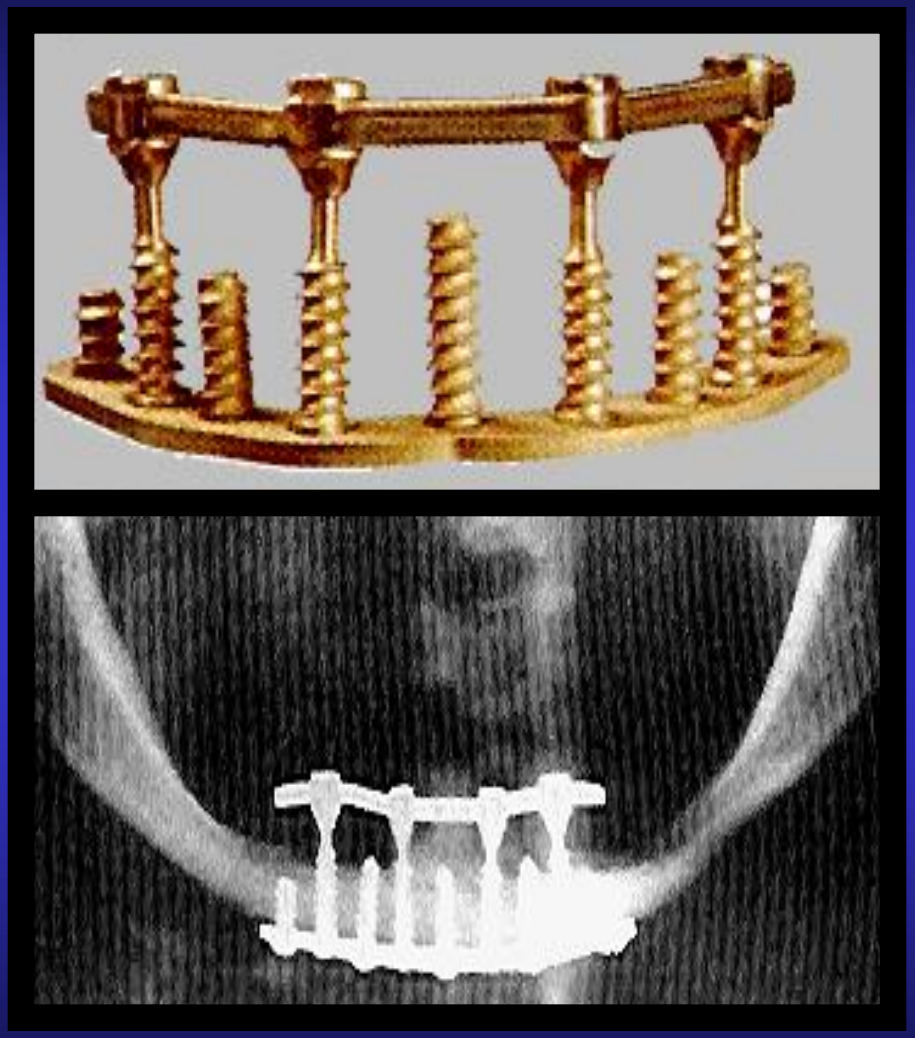
Disadvantages of subperiosteal implants

!

- operative stress
- implant material
- no gingival seal
- uncertain loading
- lack of quality control
- few prosthetic options
- failure = tissue damage

Classification of oral implants based on their anatomical location

- intramucosal
- subperiosteal
- **transmandibular**
  - transdental
  - endosteal

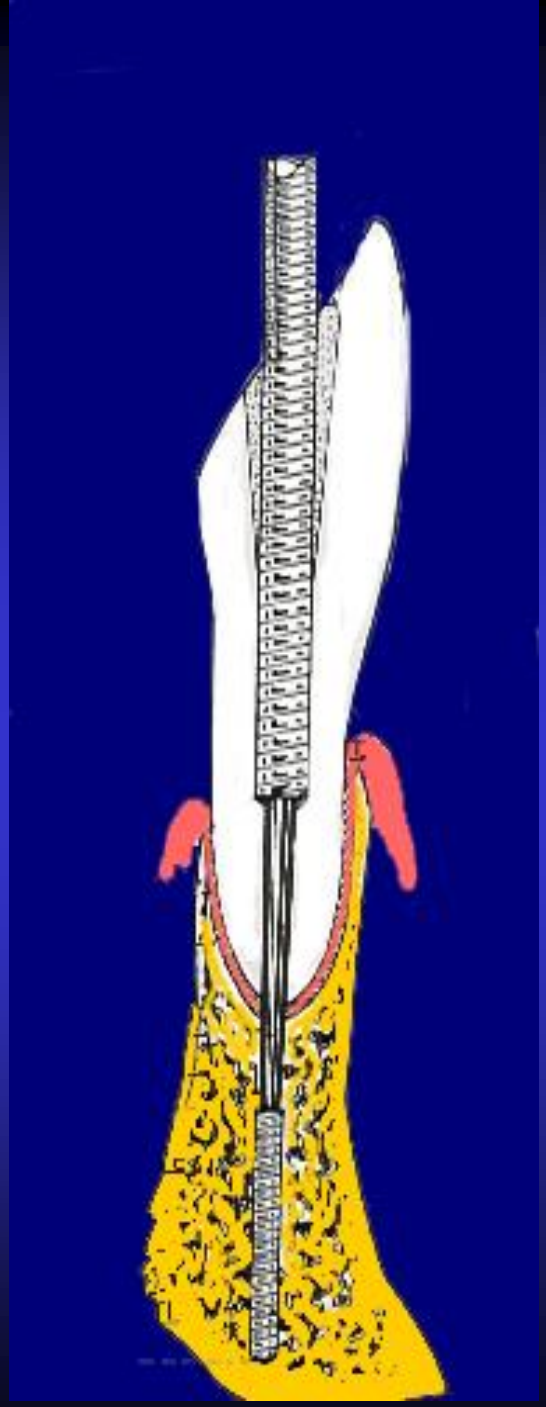


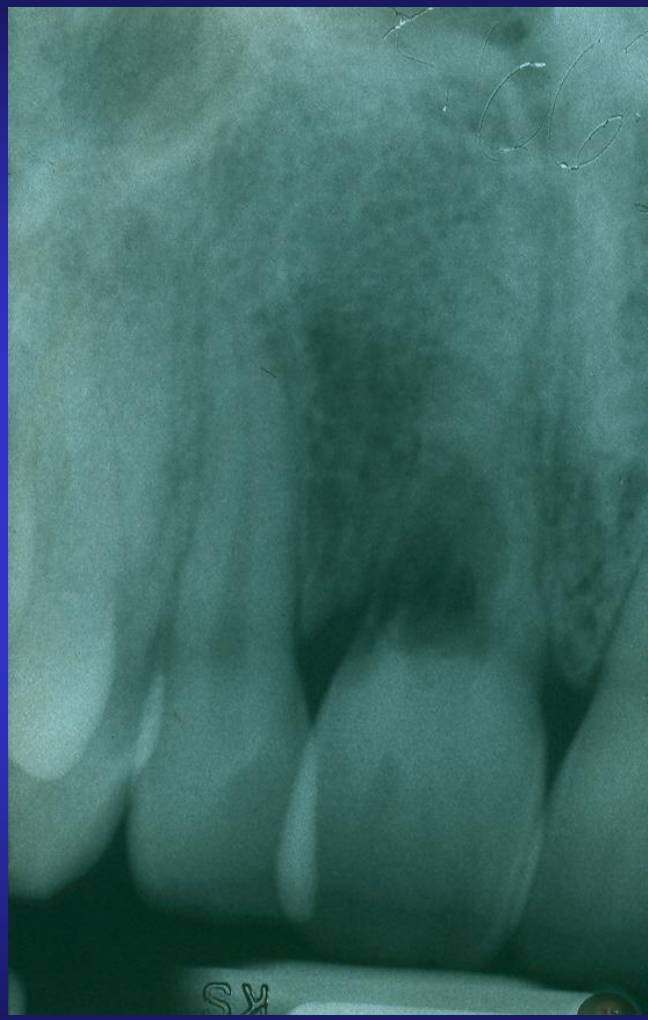
Transmandibular implant

/H.Bosker 1986/

Classification of oral implants based on their anatomical location

- intramucosal
- subperiosteal
- transmandibular
- **transdental**
- endosteal





Classification of oral implants based on their anatomical location

- intramucosal
- subperiosteal
- transmandibular
- transdental
- **endosteal**

VARIOUS TYPES OF ENDOSTEAL IMPLANTS

Classification of endosteal implants based on their shape

- **Extension implants**

  Blade-vent shape

- **Rotation- symmetric /root-form/ implants**

  Needle form implants

  Cylindrical types /press-fit/

  Screw implants

Classification of endosteal implants based on their shape

- Extension implants

  Blade-vent shape

- Rotation- symmetric /root-form/ implants

  Needle form implants

  Cylindrical types /press-fitt/

  Screw implants

Clinical evaluation of blade-type implants

- fibro-osseointegration – „pseudo-parodontium”
- poor biomechanics
- limited prosthetic options
- difficult removal – **bone loss**

Classification of endosteal implants based on their shape

- Extension implants
  - Blade-vent shape
  - Three dimensional implants /disc/

- Rotation- symmetric /root-form/ implants
  - Needle form implants
  - Cylindrical types /press-fitt/
  - Screw implants

ADVANTAGES OF ROOT-FORM IMPLANTS

- precise preparation of implant bed

  ⬇

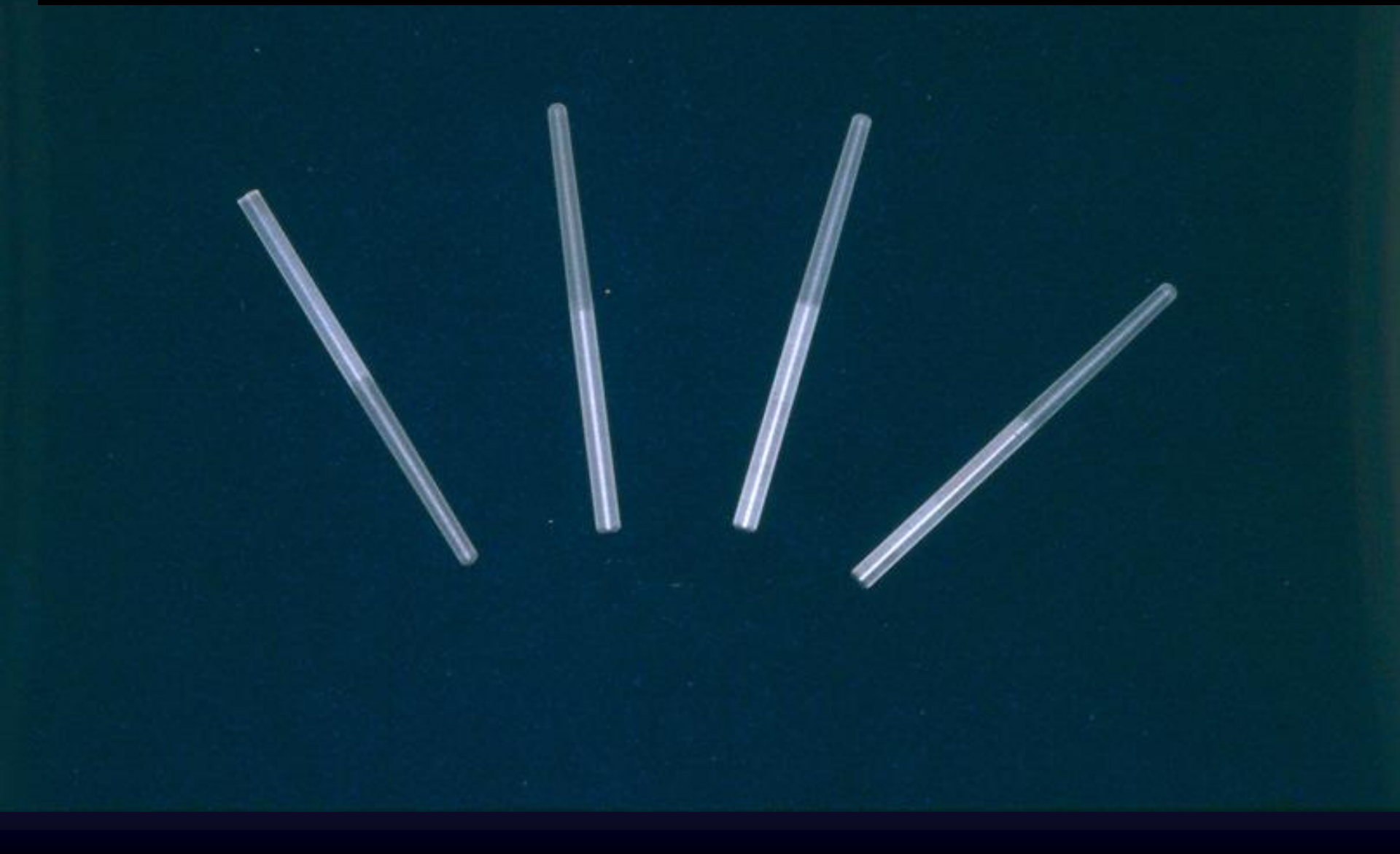
  good primary stability
- easy placement
- easy removal

Classification of endosteal implants based on their shape

- Extension implants
  - Blade-vent shape
  - Three dimensional implants /disc/

- Rotation- symmetric /root-form/ implants
  - **Needle form implants**
  - Cylindrical types /press-fitt/
  - Screw implants

Monocristalline aluminium-oxide implants for transdental fixation



Classification of endosteal implants based on their shape

- Extension implants
  - Blade-vent shape
  - Three dimensional implants /disc/
- Rotation- symmetric /root-form/ implants
  - Needle form implants
  - **Cylindrical types /press-fitt/**
  - Screw implants

Forms of different cylindrical implants

Classification of endosteal implants based on their shape

- Extension implants
  - Blade-vent shape
  - Three dimensional implants /disc/
- Rotation- symmetric /root-form/ implants
  - Needle form implants
  - Cylindrical types /press-fitt/
  - **Screw implants**

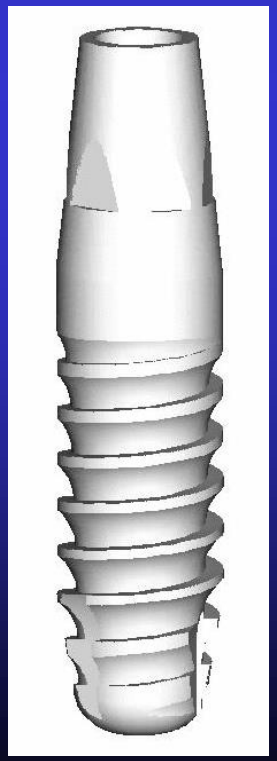
Various forms of screw implants

The advantages of screw-type implants

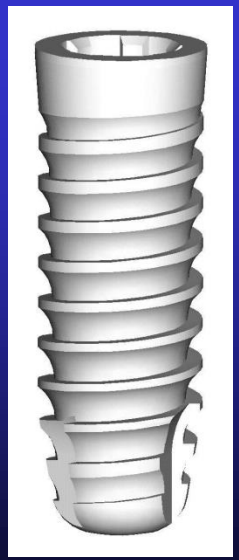
- Enlarged surface area
- Better primary stability even in soft bone

Screw implants

Single-part



Two-part



Aluminium-oxide /alumina/ implants

Sandhaus 1964, Schulte, Heimke 1976

Vajdovich 1982 /Diakor®implants/