POWER HOUR

An Afternoon at the Faculty • Part 2
New Materials and Treatment Procedures in Fixed Prosthodontics

Asbjòrn Jokstad, DDS, Ph.D. Toronto ON

Time: 2:45 p.m. – 3:45 p.m.
Room: 206AB
Chair: Dr. Ronald Traub

Of Interest To:

Dentists	
Clinical Assistants	

ABOUT THE SPEAKER

Dr. Jokstad is Professor and Head of Prosthodontics at the University of Toronto Faculty of Dentistry. He is the Nobel Biocare Chair in Prosthodontics also at the Faculty and the Scientific Affairs Manager of the FDI World Dental Federation. Previously Dr. Jokstad was a professor in both cariology and in prosthodontics at the University of Oslo in Norway. He completed his undergraduate dental education in 1979 and has been a specialist in prosthodontics and oral function since 1994. He has published approximately 150 research and teaching articles, book chapters and abstracts. Publications and lectures have had emphasis on: evidence-based dentistry, prosthodontics, dental restorative materials, toxicology, and temporomandibular dysfunction. Dr Jokstad also has extensive experience in the editorial boards of different scientific dental journals.

ABOUT THE PROGRAM

The speaker will present a comprehensive review of new materials and techniques that have been introduced in fixed prosthodontics during the last several years and venture both subjective and research based opinions about their merits and disadvantages.

WHAT YOU WILL LEARN

Recognize the extensive array of alternative techniques that are available in modern prosthodontics with regard to:

- Rotating instruments
- Root posts
- Gingival retraction techniques
- The impression
- Bite & jaw registration techniques
- Color shade registration
- Temporary restorations
- Restorative materials,
- Production techniques of fixed prostheses
- Cementation.

WHO SHOULD ATTEND THIS PROGRAM?

This program is geared primarily for dentists but would be of interest to clinical assistants engaged in assisting restorative prosthetic procedures.

THIS LECTURE IS SPONSORED BY THE UNIVERSITY OF TORONTO, FACULTY of DENTISTRY

University of Toronto
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Continuing Dental Education

Toronto Academy of Dentistry

NEW MATERIALS AND TREATMENT PROCEDURES IN FIXED PROSTHODONTICS

Asbjørn Jokstad
Professor and Head, Prosthodontics
Nobel Biocare Chair of Prosthodontics
University of Toronto

Greetings from Norway

New materials & methods– fixed prostheses

1. Rotating instrument
2. Root Post
3. Gingival retraction
4. Impression
5. Bite & jaw registration
6. Color shade
7. Temporary construction
8. Restorative materials
9. Production techniques
10. Cementation

New materials & methods- – fixed prostheses

- Dental implant components & abutments (currently 290 implant names!)
- Articulators
- Precision attachments
- Repair possibilities (Ceram fracture, crown removal, post retrieval, etc.)
- Laboratory: process & new materials

Tooth

Tooth + Mucosa

Fixed

Removable

Mucosa

Implant

New materials & methods–Fixed prostheses

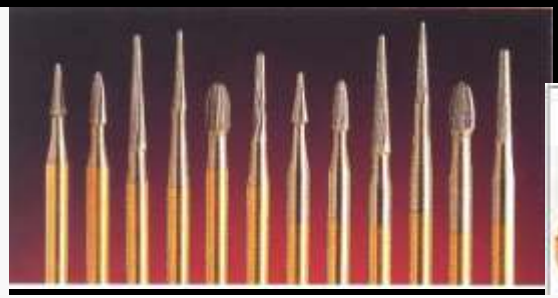
Preparation & finishing kits

Axis

- Acrylic Adjustment Kit
- R.A.P.T.O.R. Resin Sculpting Set
- R.A.P.T.O.R.

Brasseler

- Acrylic Temporization Kit
- Anterior Bur Box
- Esthetic Inlay/Onlay
- Nixon Inlay/Onlay II
- Nixon Porcelain Veneer II Laminate Veneer System
- Ultra Denture Adjustment & Polishing Kit



Cosmedent

Top Finisher System

Dentsply/Caulk

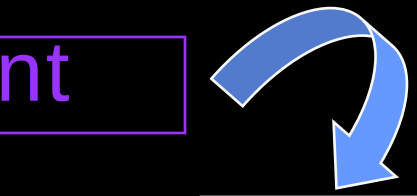
Enhance Composite Finishing and Polishing System

Nobel Biocare

Procera Preparation Kit

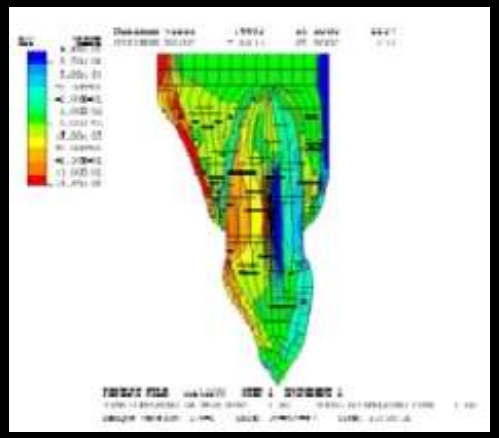
New materials & methods–Fixed prostheses

Rotating instrument



Root Post

1. Cast
2. Prefabricated
   - Metal
   - Non-metal



1. Cast posts

Indirect technique

- Impression

Direct technique: Post & resin

- Wax
- Resin
  - Accuset
  - ExactaCast
  - Luminex
  - GC Pattern Resin

2. Prefabricated posts

1. Cast Posts
   - Indirect
   - Direct: Post & resin
2. Prefabricated Posts

	Additional core	
Metal	No	Yes
Non-metal	-	Yes
		> 30 products

”Core”-materials

Bis-core	Bisco	Dual co.
Bisfil core	Bisco	Light co.
Bisfil II	Bisco	Chem.Co
Blue core	Teledyne	Chem.Co
Build-It! FR	Jeneric	Dual co.
Ceracap	Brasseler	ceramic
Clearfil Core	Kuraray	Chem.Co
“ “ PhotoCore	Kuraray	Light co.
Coradent	Vivadent	Chem.Co
Core Paste	Den-Mat	Chem.Co
” ” Syringe	Den-Mat	Dual co.
Core-Flo	Bisco	Chem.Co
CoreRestore2	sds/Kerr	Dual co.
” ” HDOC	sds/Kerr	Light co.
CoreShade	Shofu	GIC

CuRay-support	Sci-Pharm	Dual co.
Encore	Centrix	Chem.Co
FluoroCore	Dentsply	Dual co.
Fuji-II LC	GC	GIC-modif.
HardCore	Pulpdent	Dual co.
Infracore	Temrex	Dual co.
Ketac silver	3M ESPE	Ag-GIC
Light-Core	Bisco	Light co.
LuxaCore Auto	DMG	Dual co.
MagnaCore	Bosworth	Dual co.
Microrest Core	GC	Chem.Co
Parapost Paracare	Coltene	Dual co.
Rebilda	VOCO	Chem.Co
Ti-Core	EDS	Chem.Co
Vitremer	3M Espe	GIC-modif.

2. Prefabricated posts, metal

Steel
Titanium-alloy
Titanium

"Active" – "Inactive"

Conical
Parallel
Steps

Threaded
Smooth
Structured

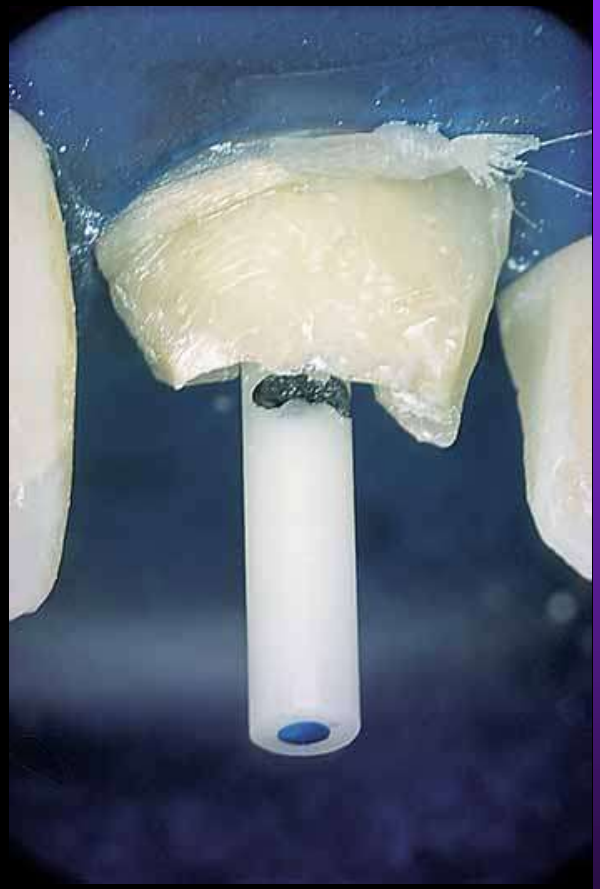
Slots & grooves

Flat
Conical
Ovoid

2. Prefabricated post, non-metal

Five main groups

1. Ceramic, prefabricated
2. Ceramic, made in the dental laboratory



Posts made in ceramics

Prefabricated

Biopost (Incermed), ZrOx, D, ~ 1990

Cerapost (Brasseler), 1995

Cosmopost (Ivoclar), 1998

Laboratory

+ ”Cosmopuck” (Ivoclar), 1998

In-Ceram (VITA), 1994

2. Prefabricated post, non-metal

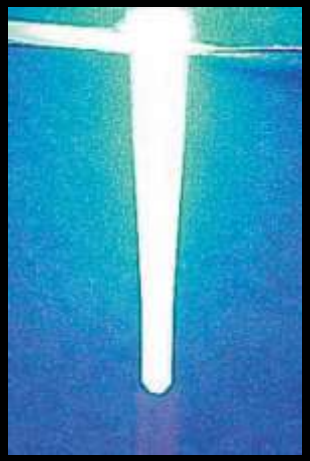
Five main groups:

1. Ceramic, prefabricated
2. Ceramic, made in laboratory
3. ”Black post”, Carbonfibres dispersed in resin
4. ”White post”, Quartsfibres dispersed in resin
5. ”Translucent post”

Non-metal, non-ceramic posts - many variants

Quarts
Quarts+Zirkonium
(Carbon)
Quarts & Carbon

composite
"resin"
epoxi
polyester



New materials & methods–Fixed prostheses

Rotating instrument

Root Post

Gingival retraction

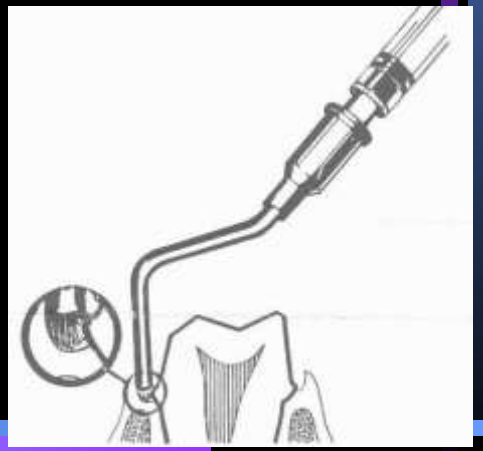
1. Cord
   - Impregnated
   - Non-impregnated
2. Gel/paste
3. Cotton
4. Electrosurgery
5. (Cobber-tube)

Retraction cords, impregnated

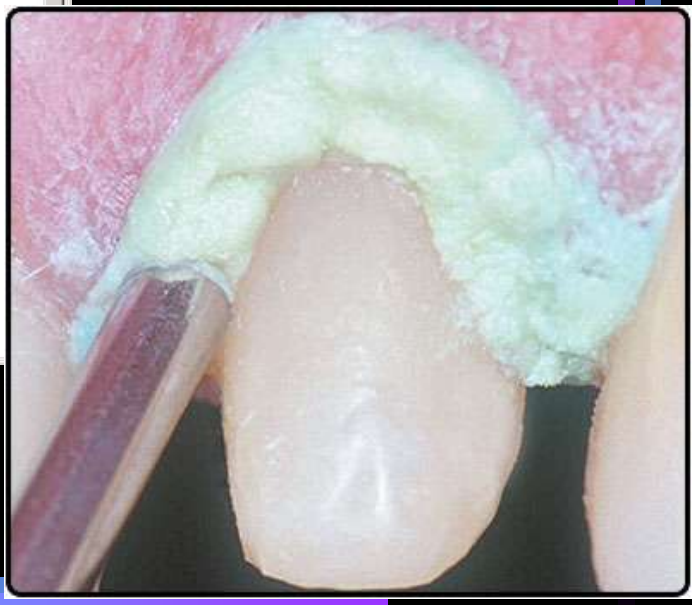
Product	Producer	Active substance	
Altrac	VOCO	$AlCl_3$	
Biopak	SDI	**$AlCl_3$**	twinned
Crown-Pak	Gingi-Pak	**dl-Adrenalin** (4-ply)	twinned
Gingi-Aid	Gingi-Pak	**$Fe_2(SO_4)_3$**	**woven**
Gingi-Pak	Gingi-Pak	dl-Adrenalin (2ply- Soft-twist)	**twinned**
Gingi-Tract	Den-Mat	**$AlSO_4$,** 0.5 mg/i	twinned
Gingibraid	VanR	$AlKSO_4$/adrenalin + Aluminium	**braided**
Hemalin	VOCO	Adrenalin	
Hemodent	HAWE Premier	**$AlCl_3$** 21%	twinned
Pascord	Pascal	$AlSO_4$	twinned
Racestyptin	Septodont	$AlCl_3$+lignocain	braided
Racord	Pascal	dl-Adren HCl +Znfenolsulfonat 0.3%	twinned
Retracto	Roeko	$AlCl_3$	
Sil-Trax	Pascal	$AlSO_4$/dl-adrHCl/dl-adr+Znfenolsulfonat	braided
Retreat/II	Henry Schein	$AlSO_4$/adrenalin	twin/braid
Sulpak	Sultan	AlK N.F/adrenalin HCl 4%	twin/braid
Traco	VOCO	$AlCl_3$ 6%	
Ultrax	Sultan	AlK N.F/adrenalinHCl 4% /AlK+adr	braided
Unibraid	VanR	Adrenalin-alum	braided
Z-twist	Gingi-Pak	dl-Adrenalin/ $AlCl_3$	woven

Retraction cord, non-impregnated

Astringedent (Ultradent), First Stop (Stevenson), Gingi-Aid (Gingi-Pak), Gingiva liquid (Roeko), Hemodent (HAWE Premier), Hemo-gin-L (Van R Dent Prod.), Hemo-stat (Henry Schein), Ocu Clear (Health Care Prod), Orostat (Gingi-Pak), Rastringent (Pascal Comp), Racemistat (Pascal Comp), Stasis (Gingi-Pak), Styptin (Van R Dent. Prod), Ultradent Alum Chlor. (Ultradent), ViscoStat (Ultradent), Visine (Pfizer Inc), Wet Pack (Van R Dent. Prod.)



Expasyl (Kerr /Pierre Roland)



15% Al-Chlorid + Caolin

Gel-Cord (Pascal)

Comprecap (Roeko)

Retrac

New 2005:
Magic FoamCord
(Coltene-Whaledent)

New materials & methods–Fixed prostheses

Rotating instrument

Root Post

Gingival retraction

Impression

A perfect impression

1. Influence of the impression material?

Most commonly used materials in USA

	Crowns /bridges	Inlays /onlays
Vinyl siloxane	81%	71%
Alginate	38%	20%
Polyeter	28%	22%

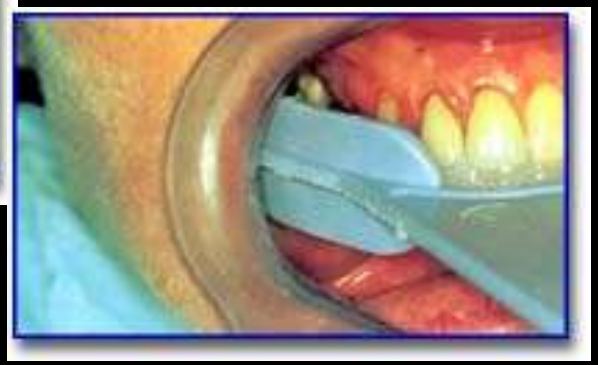
*Dental Products Report Survey, Nov 2000 n= 319 dentists

A perfect impression

2. Influence of the impression technique?

Method 1 - Dual-arch

SYN: Dual-arch impression, Double-arch impression, Triple tray technique, Closed-bite impression, Double arch single mix impression, Double arch double mix impression



Dual-arch
• Patient comfort • Maximum intercuspid • Easy for laboratory • Time
• Occlusion?

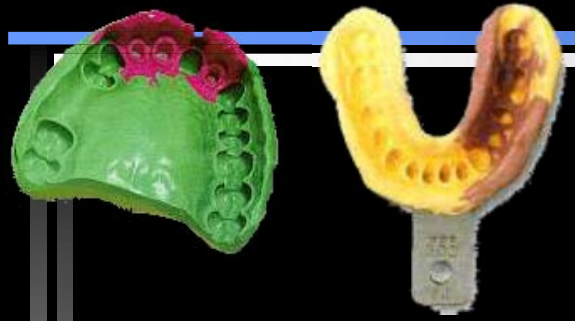
Method 2-

One polymerisation phase
- one viscosity

SYN: One phase technique, Single phase impression, Medium viscosity technique, Single mix technique, Single mix single impression, Monophase technique

Materials – ex.

Aquasil Monophase	Dentsply
Examix Monophase	GC
Imprint II	3M Espe
Impregum F	3M Espe
Provil Novo Monophase	Kulzer
President System 75	Coltene



Method 3-

One polymerisation phase - two viscosities

SYN: Double mix technique, Double mix single impression, Express technique, One step putty wash technique, Sandwich impression, Simultaneous one-step technique, Two phase technique/ impression, Wet/Wet impression

Materials – ex.

Aquasil Putty + Reprosil HF Light	Dentsply
Examix Putty + Examix Regular eller Inject	GC
Express Putty + Express Medium	3M Espe
Impregum F + Permadyne	3M Espe
Optosil Comfort P Plus + Xantopren	Kulzer
President Heavy + President (Jet) Light	Coltene

Method 4 –

Two polymerisation phases -two viscosities

SYN: Correction impression, Double impression, Double mix double impression, Overlay impression, Putty-wash technique / impression, Two-step putty-wash technique, Wash technique, Wet/Dry impression

Materials – ex.

Coltoflax + Coltex Xtrafine	Coltene
Panasil Heavy + Panasil Regular	Kettenbach
President Putty Soft + President (Jet) Light	Coltene
Examix Putty + Examix Regular	GC
Express Putty + Express Medium	3M Espe
Aquasil Putty + Reprosil HF Light	Dentsply

Dual-arch	Single-phase	Two-phase	Two-phase - two stage
•Patient comfort •Maximum intercuspid •Easy for laboratory •Time	•Fast	•Hydraulic 	•Hydraulic 
•Occlusion?		•Putty : wash hardness compatibility?	•Technique sensitive •Hydraulic •Replacement

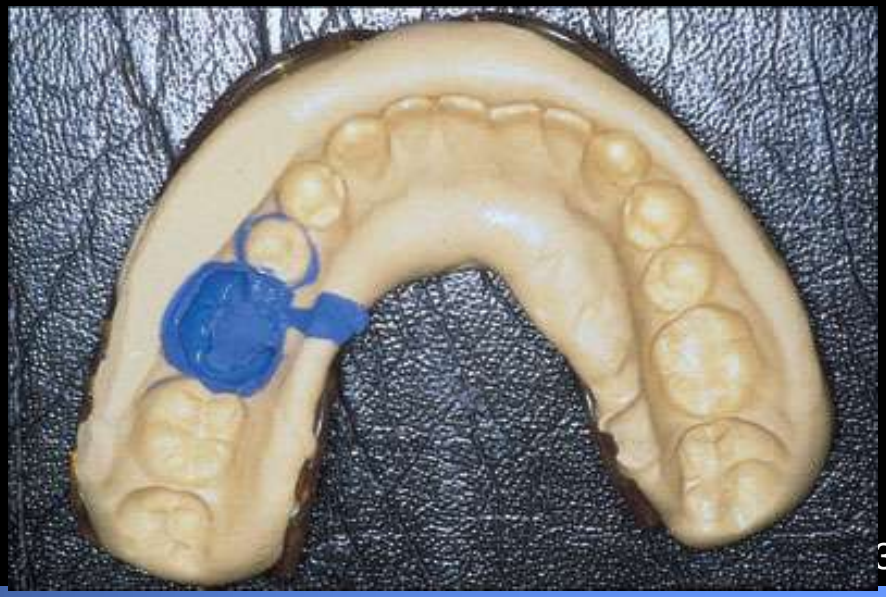
Alternative method 5 - ”Hydraulic principle”

For upper anterior abutments with fragile gingiva

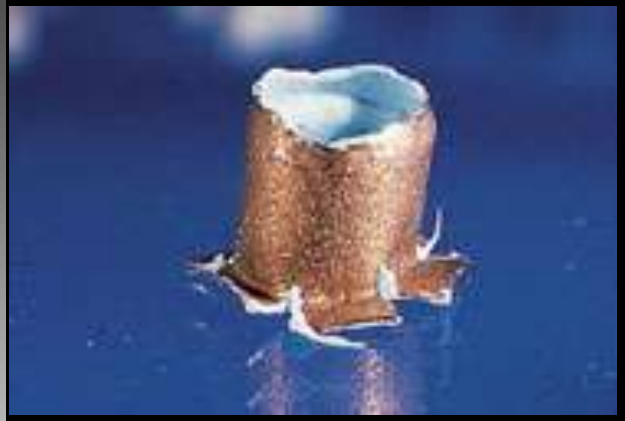
Alternativ method 6 - ”Laminar” principle

(Ref: G Schoenrock (1989)

For lower posterior abutments with dry work field problems



Alternative method 7 – Tube-section



The safest technique when abutments are periodontally unstable

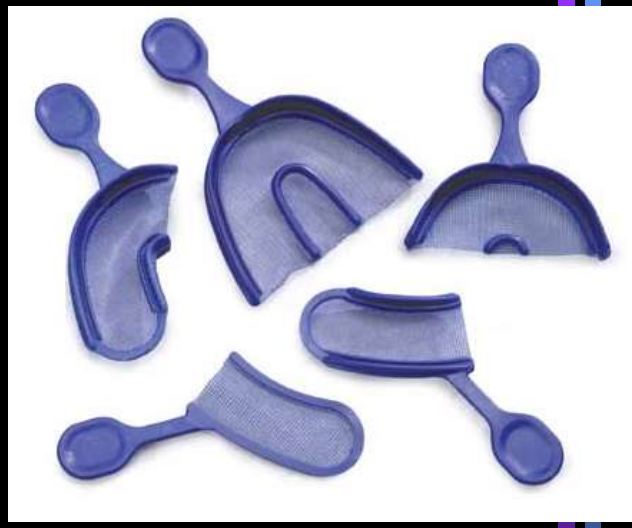
A perfect impression

3. Influence of the impression tray?

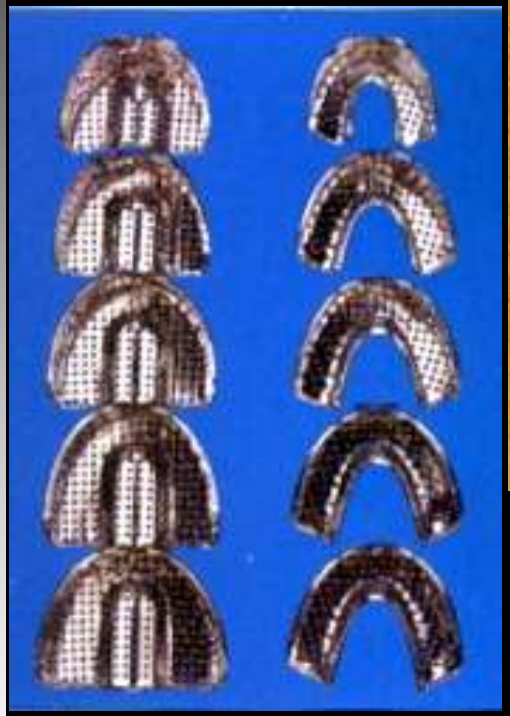
1. Dual-arch
    1. Metall
    2. Plastic
2. Other
    1. Metall
    2. Plastic
    3. Individual

Trays – Dual-arch

- Bite Relator (Temrex)
- Bite Tray (Kerr)
- Exacta
- First Bite
- Quad-Tray
- Tri-Bite (Tri-Bite)
- Triple Tray (Premier)



Trays - metal



Platinated brass
Steel
Titanium
Aluminium

Perforated
Uperforated

Trays – metal





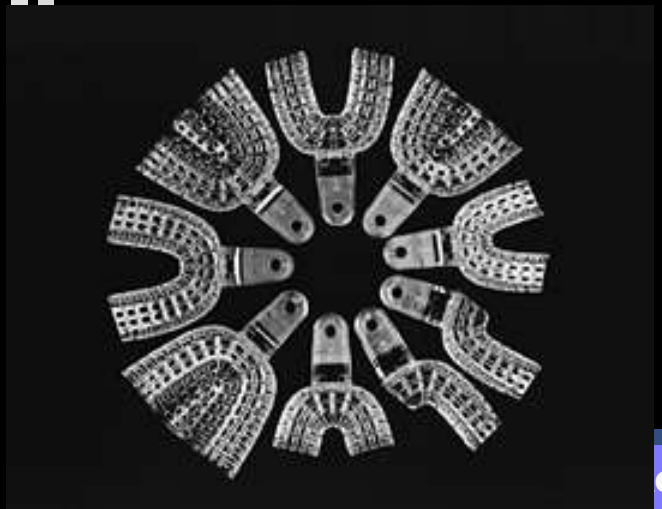


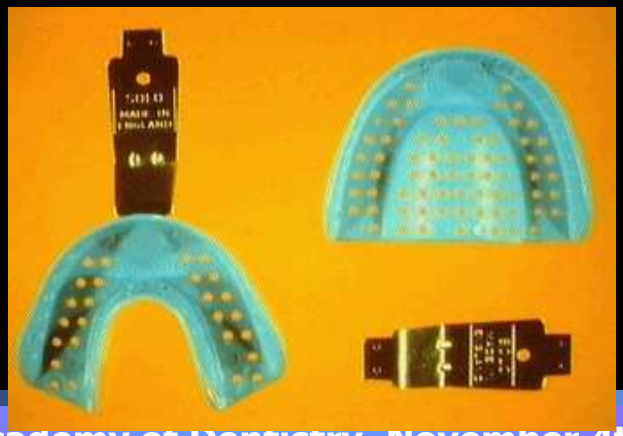


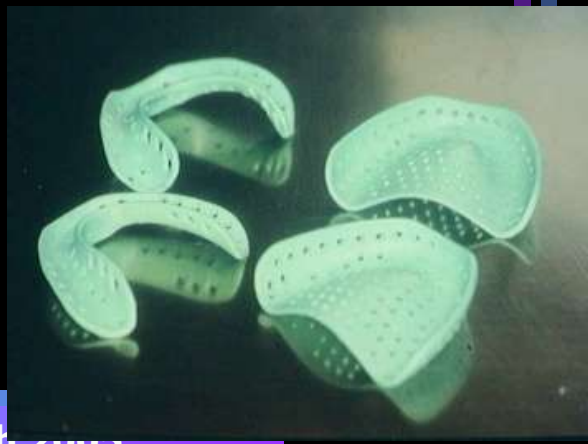
Trays – metal, for implant prosthodontics

Kohler
Medizintechnik

Trays - plastic







Most used in USA

Percent used for impressions

	Crowns /bridges	Inlays /onlays
Vinyl siloxane	81%	71%
Alginate	38%	20%
Polyeter	28%	22%

Do you ever use individual tray?

Yes 73% No 24%

***Dental Products Report Survey, Nov 2000 n= 319 dentists**

Tray - individual

Candulor C-plast	Candulor Dental	Chemical
Cavex Shellac	Cavex	Heat
Citotray	Bayer AG	Light
Comtray	Schütz Dental	Light
Easy Tray	Kerr	Heat
Erkolen	Erkodent	Heat/Vacuum
Extoral	Pro-Den	Light
Fastray	H Bosworth	Chemical
Formatray	Kerr	Chemical
Hygon	Premier	Chemical
Individo/Lux	VOCO	Chemical/Light
Ostron 100	G-C Dental	Chemical
Palatray/LC	Hereaus Kulzer	Chemical/Light
Pekatray	Bayer	Chemical
Spectra-Tray	Ivoclar	Light
SR-Ivolen	Ivoclar	Chemical
T-LUX	Scheu Dental	Light
TrayAcryl	Schütz Dental	Chemical
Triad	Dentsply	Light

New materials & methods–Fixed prostheses

Rotating instrument

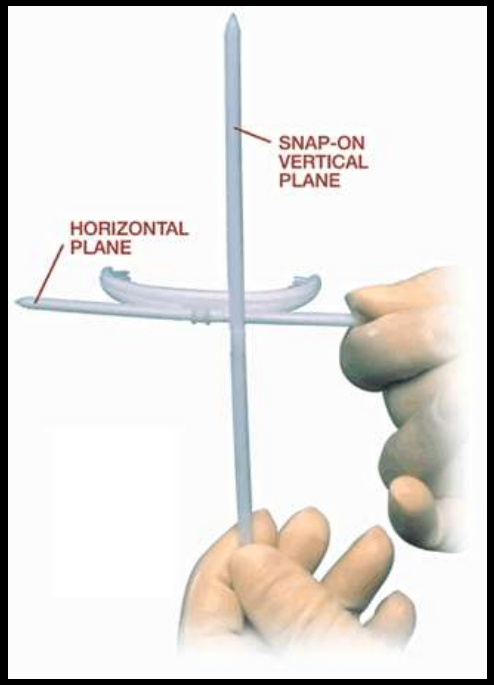
Root Post

Gingival retraction

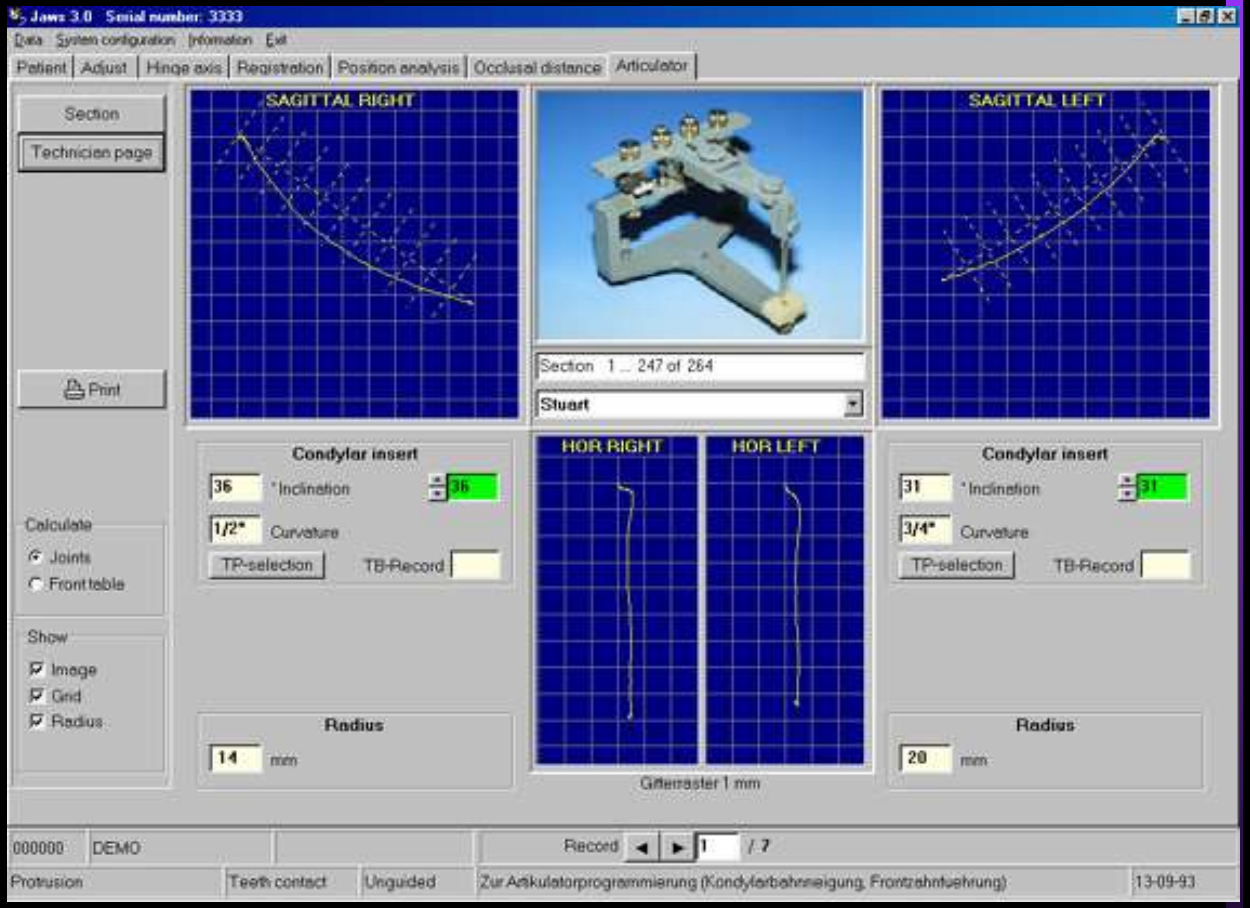
Impression

Bite & jaw registration

Bite & jaw registration



Symmetry Facial Plane Relator



JAWS 3D

New materials & methods–Fixed prostheses

Rotating instrument

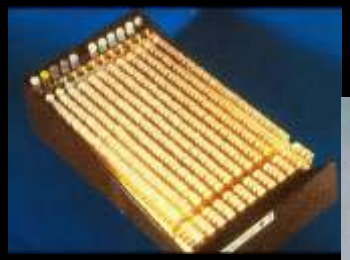
Root Post

Gingival retraction

Impression

Bite & jaw registration

Color shade



Digital Shade Systems

- Dental Color Analyser (clearlight)
- EasyShade (Vita)
- Metalor-ikam system (metalor-ikam)
- Pocketspec (Pocketspec)
- ShadeVision /ShadeRite (X-Rite)
- Shadescan (Cynovad)
- Spectroshade (mhtint)
- ShadeEye NCC (Shofu)







Shade guides

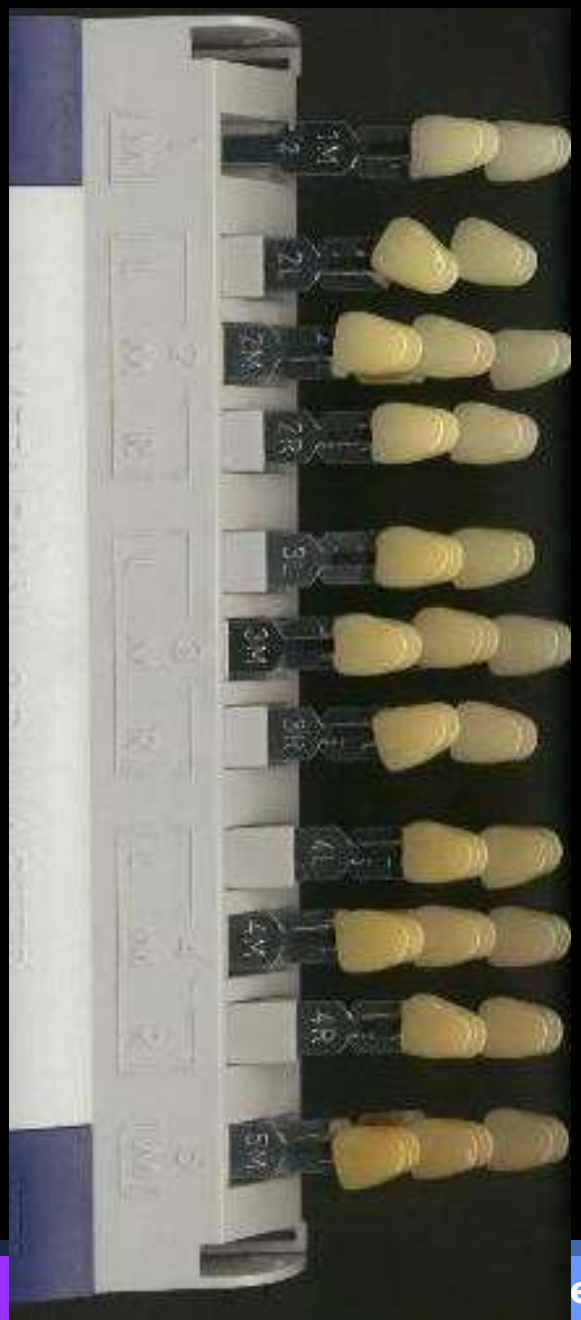
Producer	Materials	Shade
3M ESPE	Composite / Hybrid	VITA/ Biodent / Own
Bisco	Composite / Hybrid	VITA
Coltène	Composite	VITA
Dentsply	Composite / GIC / Hybrid / Ceram / Prefabricated teeth	Biodent/ VITA/ Own
Discus	Composite	Own
DMG	Composite / Hybrid / GIC	VITA
Ducera	Ceram	Biodent / VITA
GC	Hybrid / GIC / Ceram	VITA
H Kulzer	Composite / Hybrid / Prefabricated	Biodent/VITA
Jeneric	Composite / Ceram	Bioform/VITA
Kerr	Composite	VITA
Shofu	Ceram	VITA / Vintage Halo
Ultradent	Composite	VITA
VITA	Ceram / Prefabricated teeth	VITA
Vivadent	Composite / Ceram	Chromascop/VITA/ Own

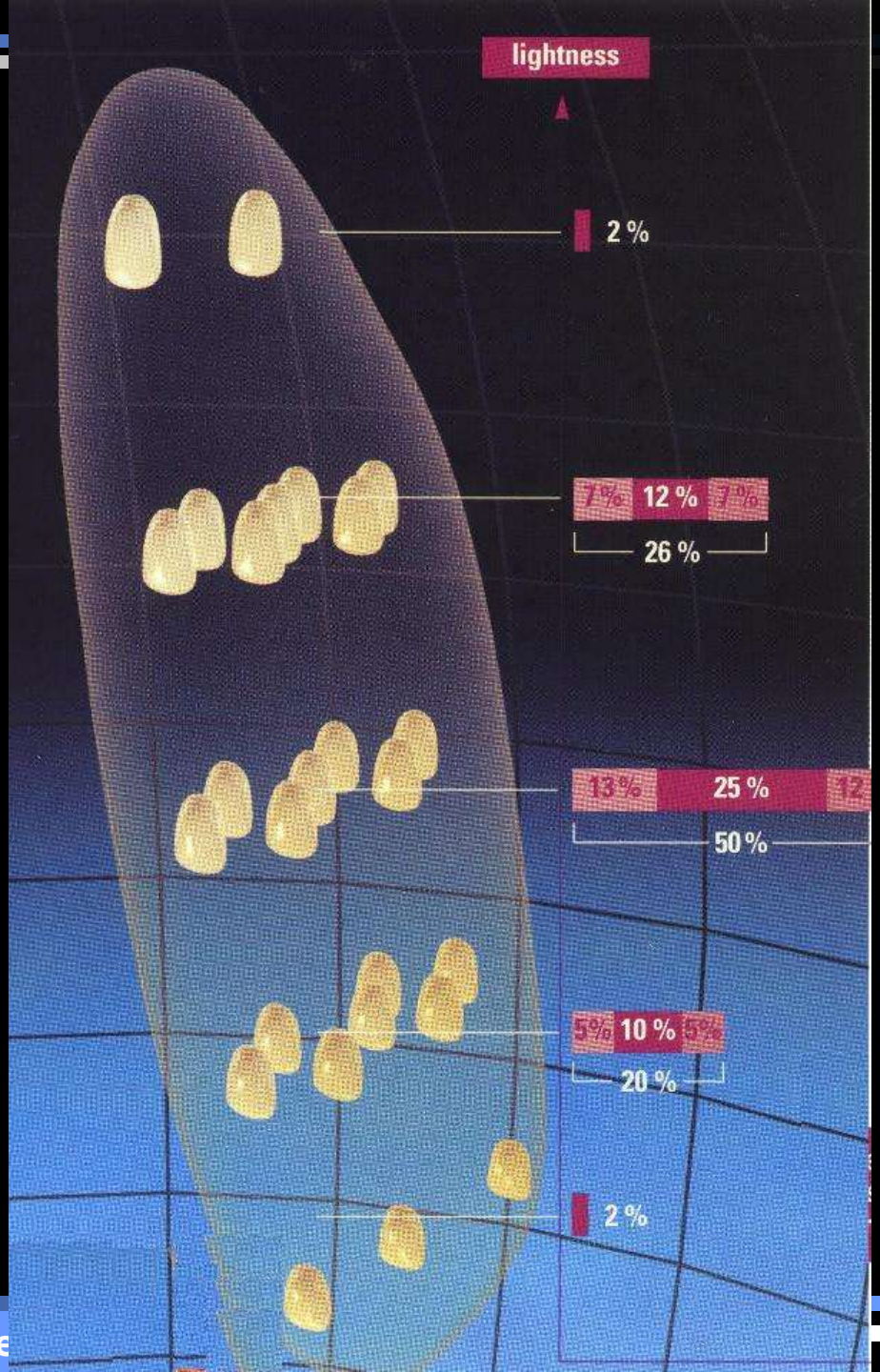
Vita 3d Master

Hue

Chroma

Value





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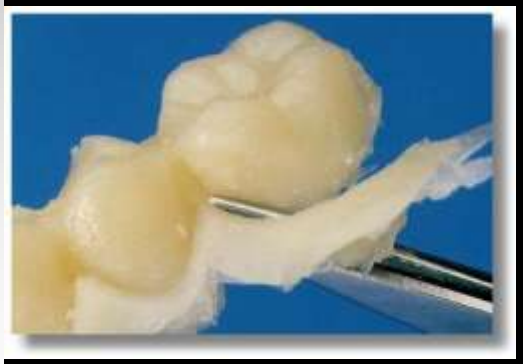
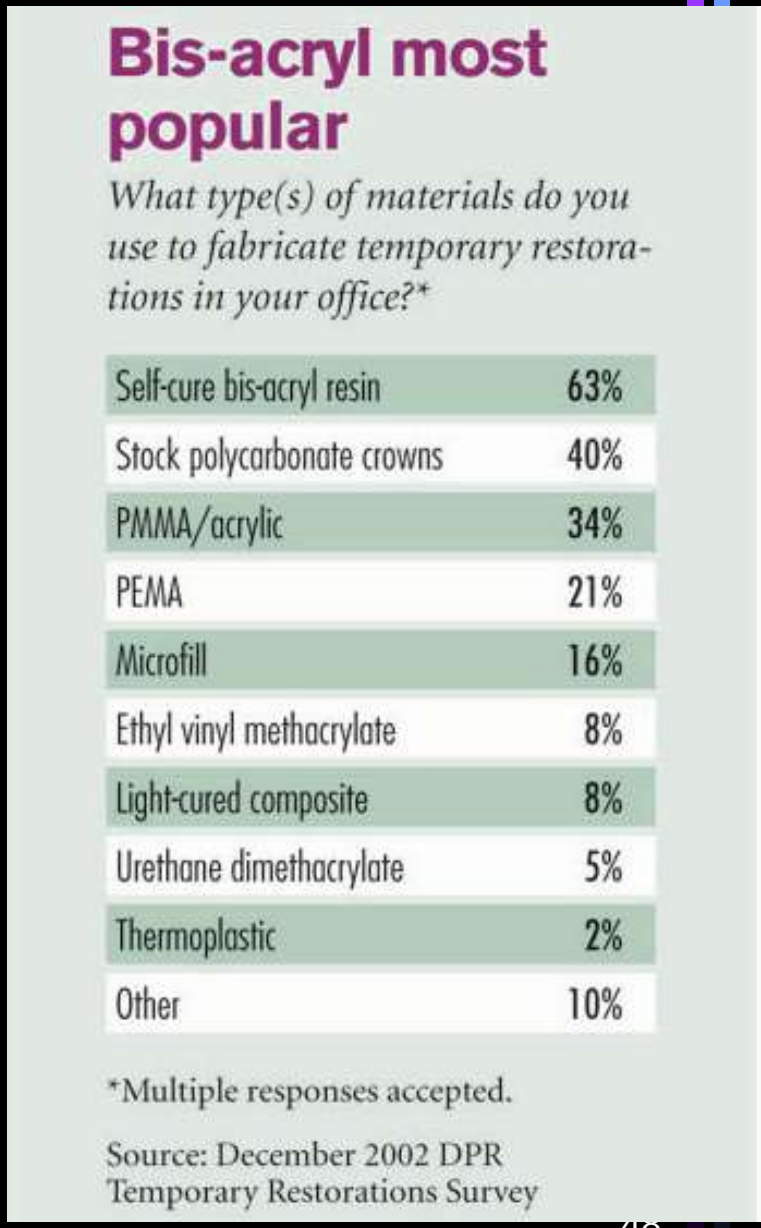


Temporary construction

Alternatives

- Bis-Acryl composite
- Polymethyl metacrylate
- Polyethyl methylacrylate

- Microfill light cured
- UDMA composite



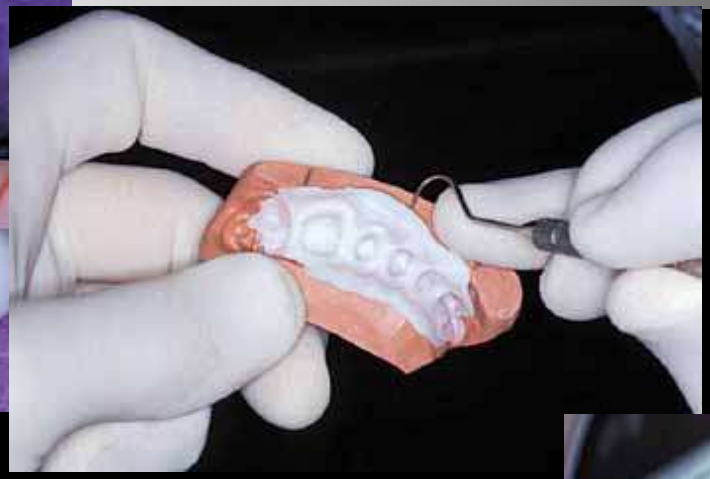
Bis-acryl most popular

*What type(s) of materials do you use to fabricate temporary restorations in your office?**

Self-cure bis-acryl resin	63%
Stock polycarbonate crowns	40%
PMMA/acrylic	34%
PEMA	21%
Microfill	16%
Ethyl vinyl methacrylate	8%
Light-cured composite	8%
Urethane dimethacrylate	5%
Thermoplastic	2%
Other	10%

*Multiple responses accepted.

Source: December 2002 DPR Temporary Restorations Survey



Bis-Acryl (Chemical cure)

CoolTemp	Coltene
Integrity	Dentsply
Luxatemp-2	DMG
Protemp 3	3M ESPE
Structur 2	VOCO
Tempofit	Detax
Trim II	H Bosworth

Temporary cements

- Eugenol -containing
  - E.g.TempBond, Opotow Temp
- Non-eugenol-containing
  - E.g. Nogenol, TempBond NE
  - Opotow Trial, TempoSIL
- Light & chemical cured
  - E.g. Provilink

Zinc oxides top for cements

*What types of materials do you use for cementation of temporary restorations?**

Zinc oxide eugenol	60%
Zinc oxide non-eugenol	50%
Resin	23%
Polycarboxylate	23%
Other	14%

*Multiple responses accepted

Source: December 2002 DPR Temporary Restorations Survey

New materials & methods–Fixed prostheses

Rotating instrument

Root Post

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Impression

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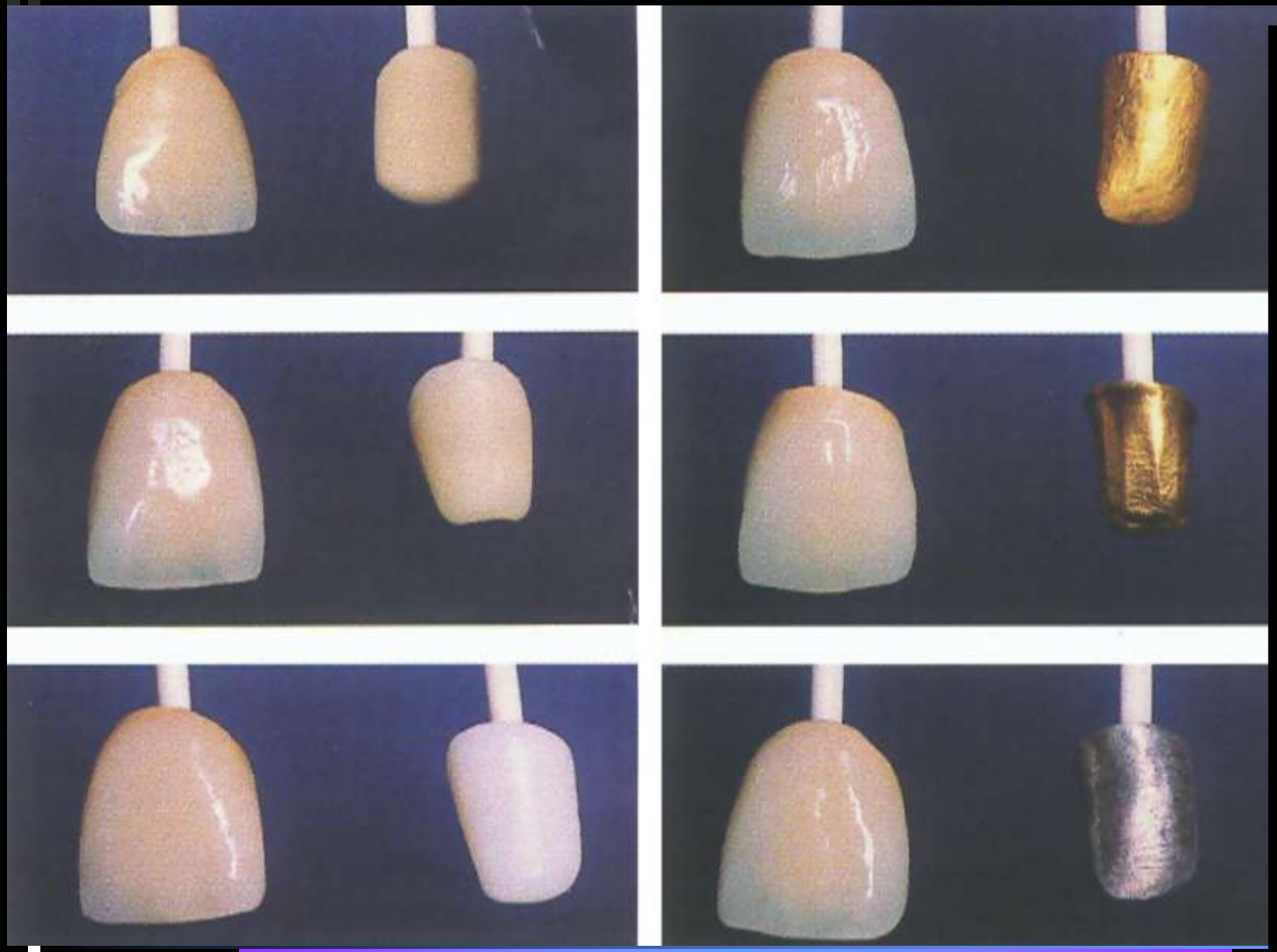
Color shade

Temporary construction

Restorative materials

Restorative



In-Ceram

LFC-Hi-Au

Procera

Galvano /AGC

Empress

Metal - ceram

Most used in USA – full ceramics

1. Pressed 63%

(e.g., Empress, OPC (2006: IPS e-max)

2. Aluminium-oxide 46%

(e.g., Procera)

3. Lithium disilicate 36%

(e.g., Empress 2)

*Dental Products Report Survey, Nov 2000 n= 319 dentists

Fibre-reinforced Composite

Laboratory

- FibreKor & Sculpture
- Vectris & Targis

Clinic

- Connect & BelleGlass
- Fiber-splint
- FibreSpan NSI & Nulite
- GlasSpan
- Ribbond & Revolution
- Ribbond Triaxial & Revolution
- Splint-it! & Flow-It! & Protect-It!
- Stick / Sticknet / Everstick

Glass

Kevlar

Polyethylene

Pre-Impregnated

Mesh

Parallel

Twinned

New materials & methods–Fixed prostheses

Rotating instrument

Root Post

Gingival retraction

Impression

Bite & jaw registration

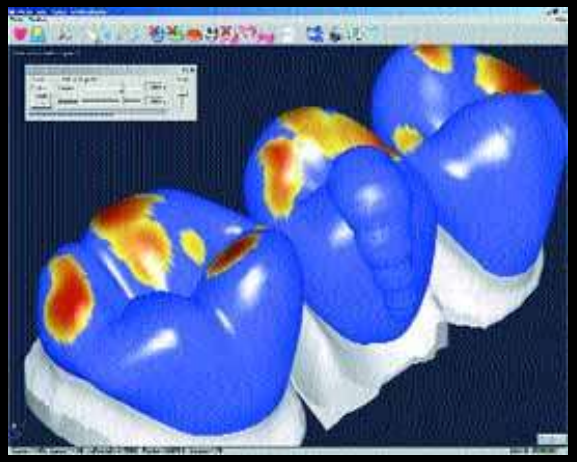
Color shade

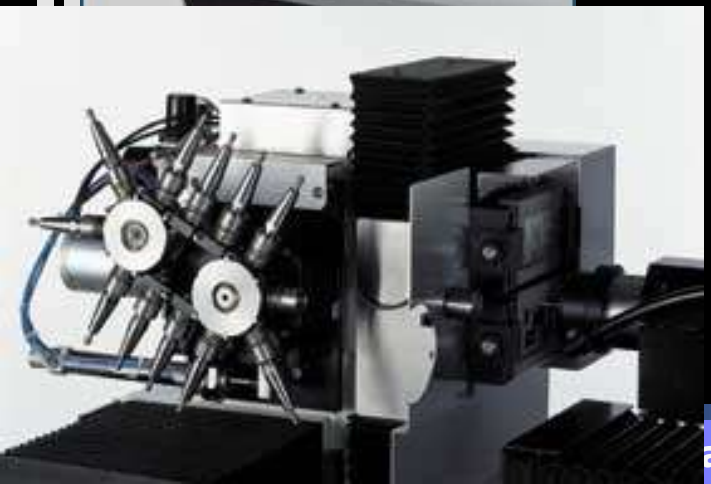
Temporary construction

Restorative materials

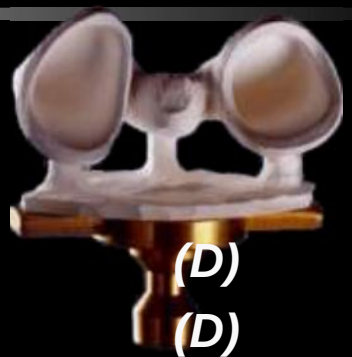
Production techniques

Production techniques- CAD-CAM (CAD-CAM)





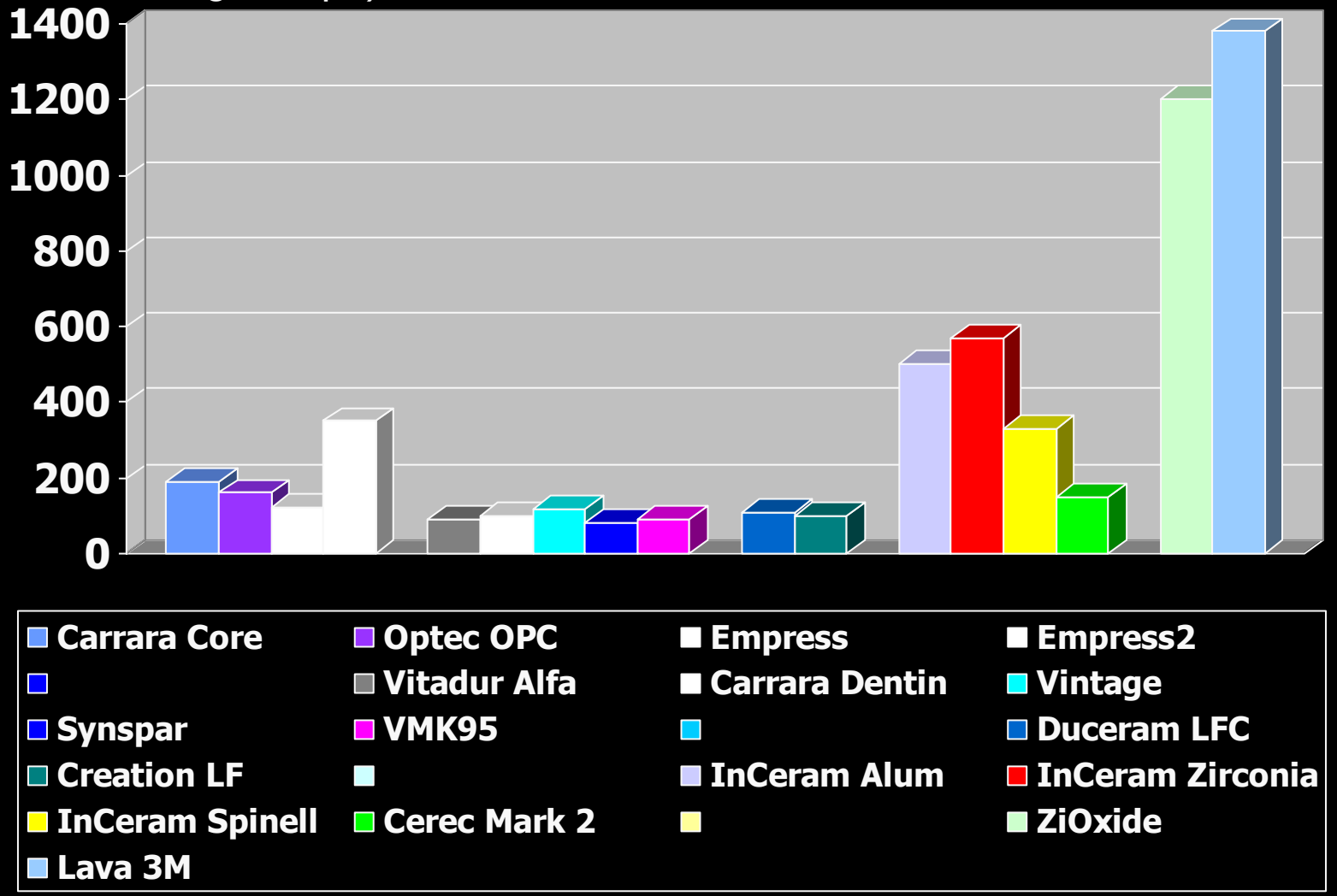
Production techniques- CAD-CAM



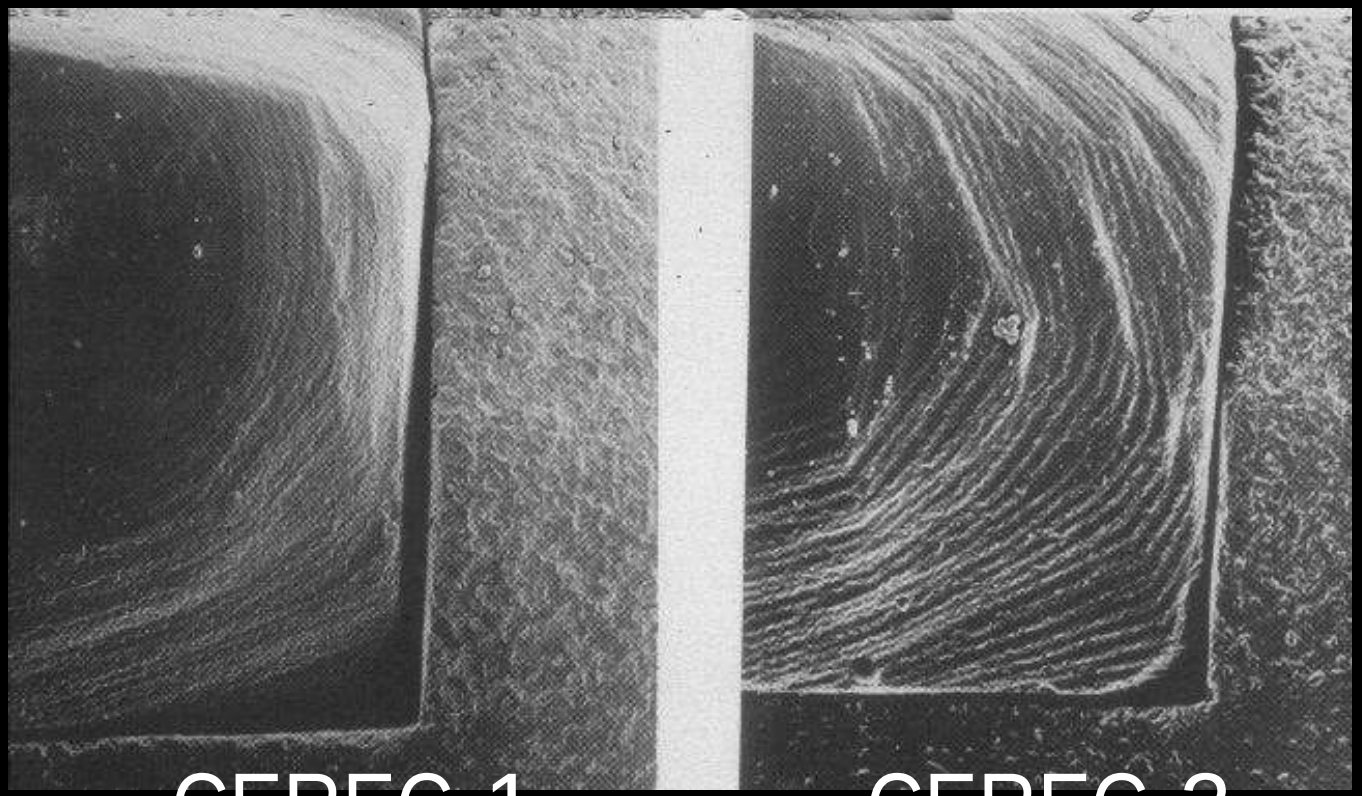
BEGO Medifacturing	*BEGO Medical*	*(D)*
CAD/CAM System	*etkon*	*(D)*
CELAY	*Mikrona Technologie*	*(CH)*
Cercon®	*Dentsply/Degudent/Degussa Dental*	*(D)*
CEREC3/CEREC Inlab	*Sirona Dental Systems*	*(D)*
CICERO®	*Cicero Dental Systems*	*(NL)*
DCS Precident	*DCS Dental*	*(CH)*
DECIM	*DECIM*	*(S)*
DENT. CAD/CAM GN-1	*GC Corporation*	*(J)*
digiDENT®	*Girrbach Dental*	*(D)*
Everest	*KaVo Elektrotechnisches*	*(D)*
Lava®	*3M ESPE Dental*	*(D)*
PRO 50	*CYNOVAD^{SM}*	*(Can)*
Procera®	*Nobel Biocare*	*(S)*
WOL-CERAM	*WDT-Wolz-Dental-Technik*	*(D)*
Xawex	*Arnold Wohlend*	*(D)*

1. Development of materials, e.g Ceramics

(Tensile strength, Mpa)

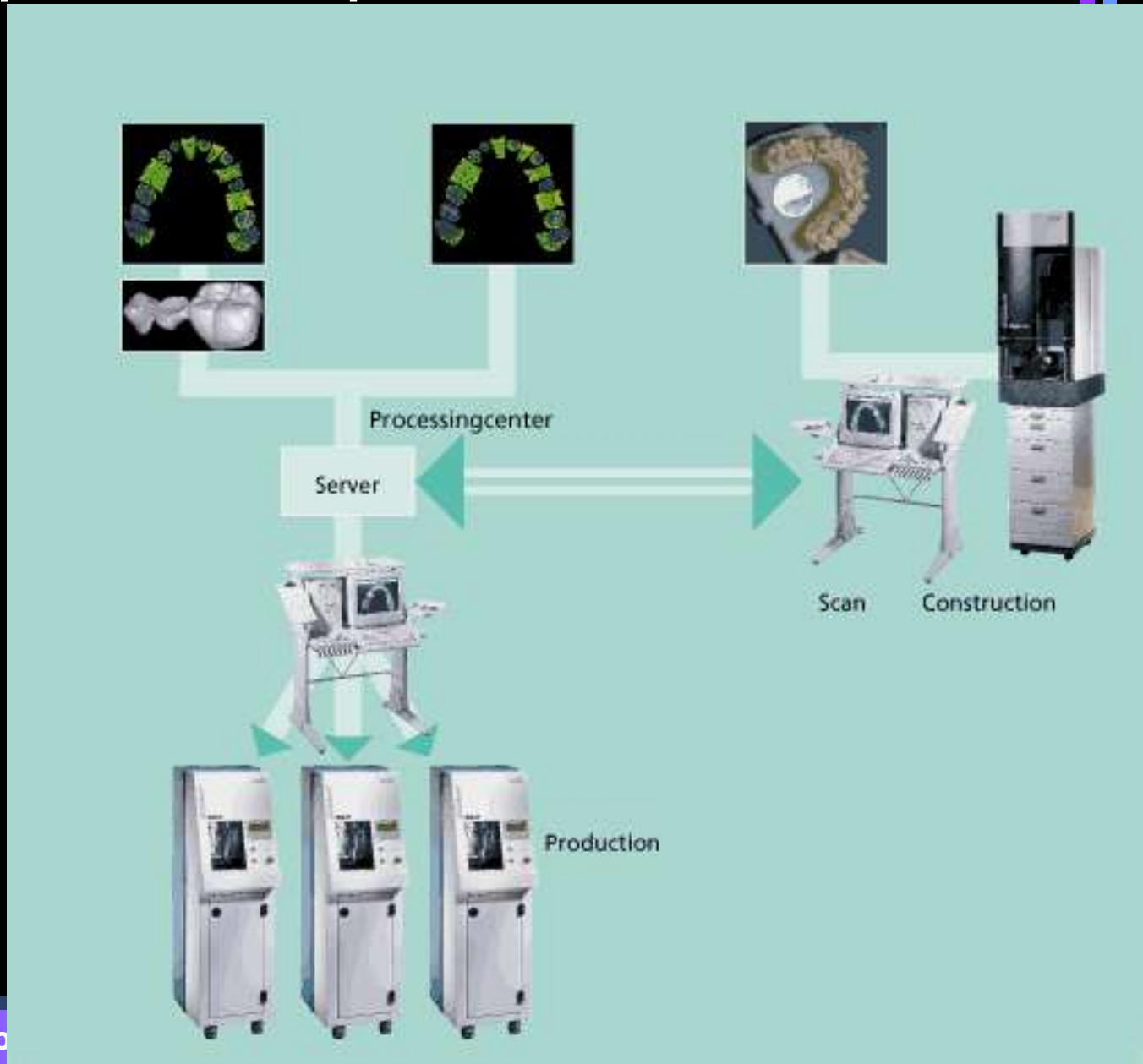


2. Development of software
Time - precision



CEREC 1 CEREC 2

3. Development of production units



New materials & methods–Fixed prostheses

Rotating instrument

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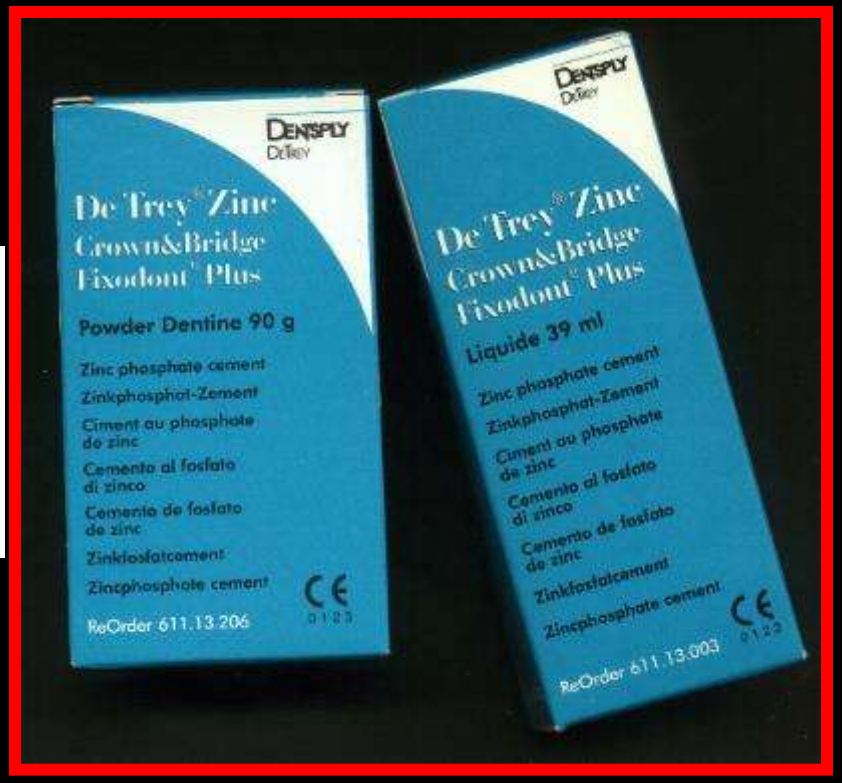
Production techniques

Cementation

Water-based - conventional



Zinc-phosphate
Polycarboxylate

Water-based: Glassionomer

Resinmodified GIC & polyacrylate modified resin

Resin Cements

Light-Cured/Dual-Cure

1. **Insure/Insure Lite**
   Cosmedent
2. **Variolink II**
   Ivoclar Vivadent

3a. **Nexus2**
   sds/Kerr

3b. **RelyX Veneer Cement**
   3M ESPE

4a. **Choice**
   Bisco

4b. **Illusion**
   Bisco

5. **Calibra**
   Dentsply/Caulk

Dual-Cure-Only

1. **Panavia F**
   Kuraray
2. **RelyX ARC**
   3M ESPE
3. **Bistite II DC**
   Tokuyama Soda/
   J. Morita USA
4. **Duo-Link**
   Bisco

5a. **Cement-It!**
   Universal C & B
   Pentron

5b. **PermaFlo DC Indirect**
   Luting/Restorative Resin
   Ultradent

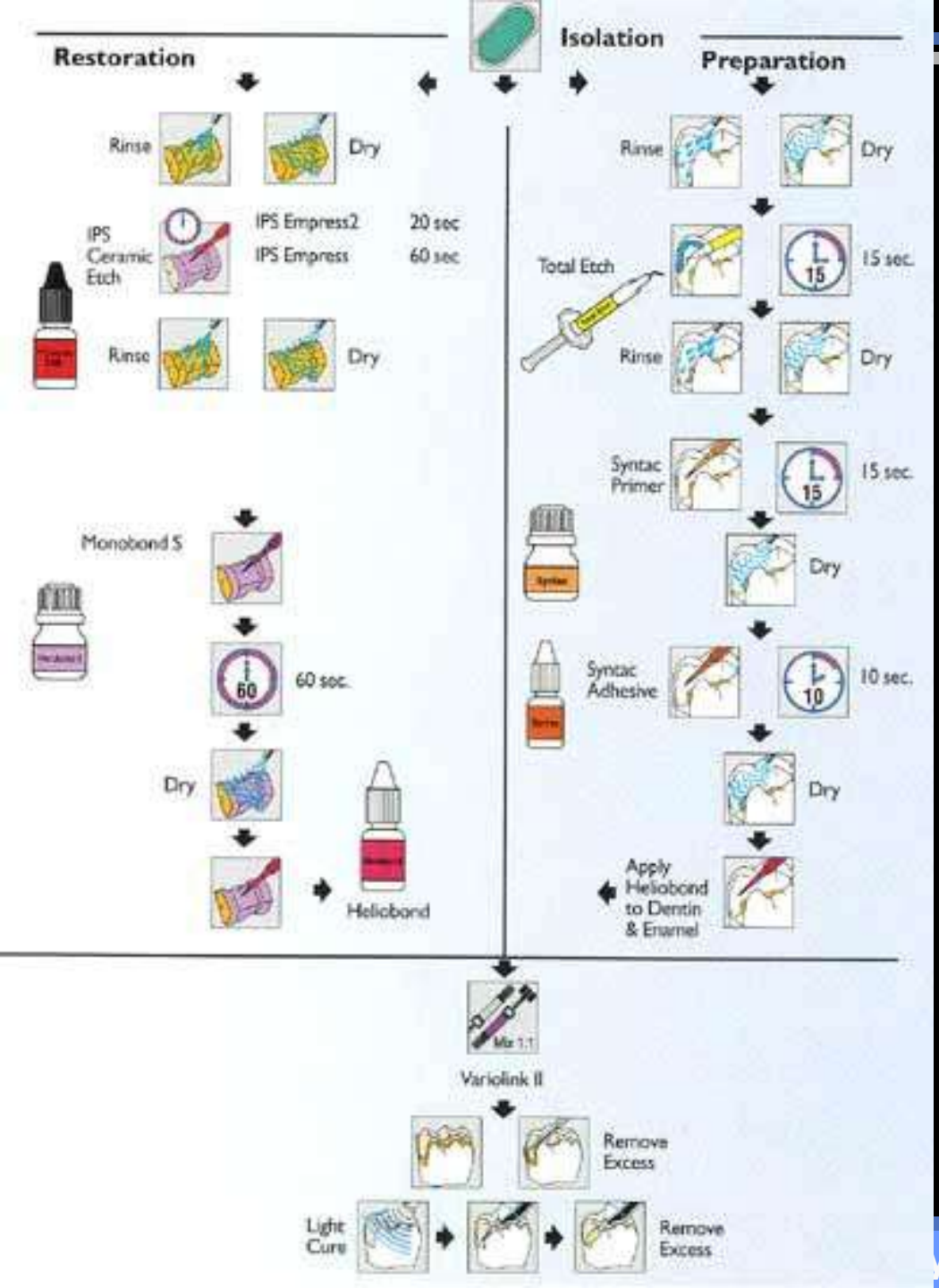
Self-Cure

1. **Panavia 21**
   Kuraray
2. **Post Cement HI-X**
   Bisco

3a. **C & B Metabond**
   Parkell

3b. **M-Bond**
   Tokuyama Soda/
   J. Morita USA

4. **C&B Cement**
   Luting Composite
   Bisco



Altern.: Water-based cements

Clean surface H_2O_2, wash, dry

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Mix powder and liquid

Apply cement in crown

Place crown on prepared tooth

Remove exess with probe

Thank you for your kind attention